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PRICE 50 CENTS TABLE OF CONTENTS ON PAGE 1 JUNE 28, 1954

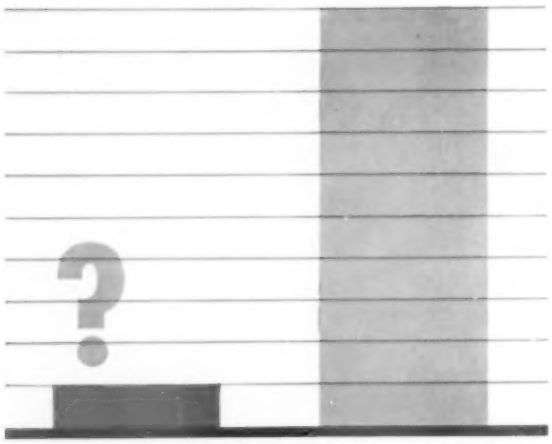
How much should you spend for valve maintenance?

In all but the most simple services, *any* kind of valves need *some* maintenance.

Of course the same thing is true with any mechanism where metal rubs metal. Take your car, for example. You lubricate the engine to *reduce* maintenance and save major repair bills. If you don't lubricate it, you save a few dollars on lubricant, but pay the far, far higher costs of part replacement. More important, you'll need a new car much oftener.

Exactly the same principle applies to valves. If you install Nordstrom lubricant-sealed valves, maintenance is generally confined to adding lubricant at intervals. You lubricate to *reduce* maintenance—to avoid the high costs of major repairs, new parts, and shorter valve life. That's the big advantage of Nordstrom valves in the first place.

Over a 20-year period, Nordstrom sales of repair parts have been less than half of one per cent of sales. In several plants in which records were kept and where Nordstrom and other valves were used, repair parts for Nordstrom valves ran about one-tenth of other makes.



LUBRICANT SEALS AND SAVES

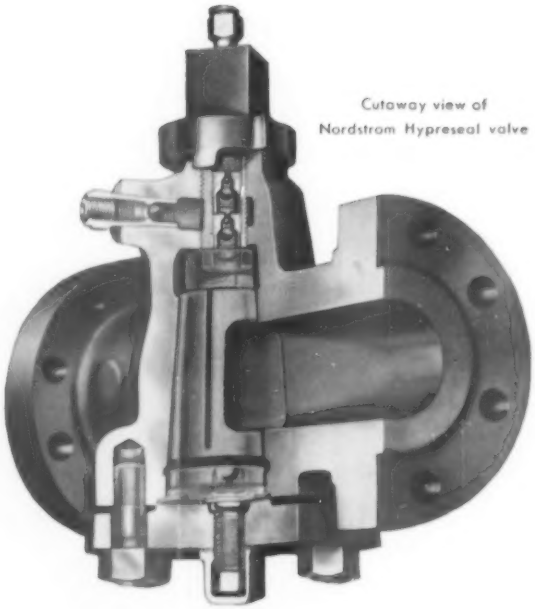
Lubricant has several functions in a Nordstrom valve, but there are two major ones . . .

First, it *seals*, surrounding the valve ports with a coating that stops little leaks before they become big problems.

Second, it *lubricates* so the plug slides without the grinding, galling wear that means high replacement costs.

So, don't be misled . . .

Valve lubrication doesn't *cost* money, it *saves* money. If you'd like to discuss the application of Nordstrom valves for any service, call your Nordstrom representative or write Rockwell Manufacturing Company, Pittsburgh 8, Pa.



Cutaway view of Nordstrom Hypreseal valve

ROCKWELL-Nordstrom VALVES

Lubricant-Sealed for Positive Shut-Off

Canadian Valve Licensee: Peacock Brothers, Limited

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JUNE 28, 1954 VOL. 53 NO. 8

OIL IN THE NEWS . . .

A Look at Pembina—One Year After Its Discovery 74
California's First Big Water Flood Nearly Ready 77
Rotary Rig Expected to Drill New Depth Record for West Virginia 79
Fairbanks Citizens Attempting to Lease 100,000 Acres in Alaska 80
Industry Committee Recommends Proration Formula for Oklahoma 81
Phillips Asks Supreme Court to Reconsider Gas Decision 82
Panhandle Eastern Asks FPC for Speedup on Expansion Plans 82
New Legislation to Boost Tanker Fleet Ready for House Vote 82
Pacific Northwest Gets Approval of Huge Gas Line 84
Company Objects to Montana Order to Drill or Lose Leases 85
Northern Natural Asks Permit for North Dakota Gas Line 85
A.P.I. Production Men Told Gas Price Getting Too High 87
New Strike Brightens Hopes for Dora Roberts Ranch Area 88
Texas Allowable Cut 190,234 Bbl. Daily for July 91
TIPRO Maps Plans for Attack on Federal Gas Regulation 92
Onassis Attempts More Shipping Deals With Kuwait, Venezuela, Iraq 94
Evaluation of Cuban Discovery Awaits Further Drilling 95
Optimism Features Renewed Discussions at Teheran 95

TECHNOLOGY AND OPERATION . . .

[1]Neutral Zone: Wafra Field Operations 98
[2]Better Refinery Maintenance With Fewer Men 101
By F. C. King
Fracturing Boosts Production in Southwest Texas 105
By J. F. Bozeman and J. P. Moran
Primary Recovery From Typical Glen Rose Field 107
[3]Richfield's New Rig Develops 3,200 Hp. 109
[4]Streamlined Internal Pipeline Cleaning-Coating Operation 112
[5]How Monsanto Controls Air and Water Pollution 114
By H. E. Morriss
It's Tough Drilling on Cedar Creek Anticline 117
Hydrocarbon Purifier Reduces Aviation-Gasoline Corrosiveness 120
Low-Cost Tank Insulation Has Quick Payout 121
On the Job: In the Plants 122
Engineering Reference Section 125-132

EXPLORATION . . .

It's Field Trip Time Again 161
Offshore Drilling in the News 162

NEWS FEATURES . . .

They Say 55
Calendar of Events 65
Journally Speaking 69
Editorial 71
This Week 73
Watching Washington 83
International News 94
Refining News 138
Personals 194
Deaths in the Industry 196
Statistical Summary 198
Drilling Statistics 199
Supply Statistics 200
Refining Statistics 201
Demand Statistics 202

DEPARTMENTS . . .

Refiners' Notebook 125
Field Processing 127
Equipment Design & Operation 129
Modern Drilling 131
Questions on Technology 132
Pipeline Patrol—Construction 143
Equipment Digest 151
Trade Literature 154
Equipment Men in News 156
Classified Advertising 203
Advertisers' Index 207

FIELDS . . .

Drilling Contractors 135
Area Field Reports 166

In Brief . . .

1. NEW OIL FIELD . . . Wafra field is the first commercial structure discovered in the Neutral Zone. It is about 20 miles south of Kuwait Oil Co.'s Burgan field and 30 miles inland from the gulf. The field has seven producing wells with daily production ranging from 1,500 to 5,000 bbl. per well.

2. LOWER COSTS . . . General Petroleum Corp.'s Torrance, Calif., refinery has reduced man-hours of maintenance per million dollars of plant replacement value from 11,200 in 1945 to 8,000 in 1953. This has been accomplished by a reduction in maintenance payroll and better training of the maintenance personnel. To initiate the program, General Petroleum officials made careful studies to determine the minimum size of crew which could maintain the refinery satisfactorily.

3. BIG RIG . . . Richfield Oil Corp.'s new drilling rig in North Coles Levee field, near Bakersfield, Calif., is among the largest ever put together from a standpoint of available horsepower. Many unitization and other features are incorporated to achieve a high degree of mobility despite the size of the rig. The rig, designed for 15,000-ft. drilling, is powered by 18 diesel engines in single and multiple units. Power output is 3,500 hp. Rig can be dismantled and moved to a new location within a 30-mile radius in 24 hours.

4. RAPID CLEANING, COATING . . . A new unit has been developed to clean the internal surface of pipe joints on one pass and spread with a corrosion-resistant protective coating on the reverse pass. Purpose of the unit is to provide protection against corrosion and to increase the throughput of a given size line. The new development consists of a rotating head driven by a hollow shaft 50 ft. in length. The rotating head is made up of wire-brush cleaner with three spray guns mounted at the end.

5. REDUCED POLLUTION . . . All organic wastes at the plant of Monsanto Chemical Co. in Texas City are burned insofar as is possible. Other measures taken to alleviate pollution are the establishment of a leak committee, azeotropic distillation to recover hydrocarbons from waste water, steam stripping to remove acrylonitrile waste, and dilution to render other wastes innocuous. Investment in equipment for the waste control program amounts to nearly $1,000,000. Operating costs are about $25,000 per month.

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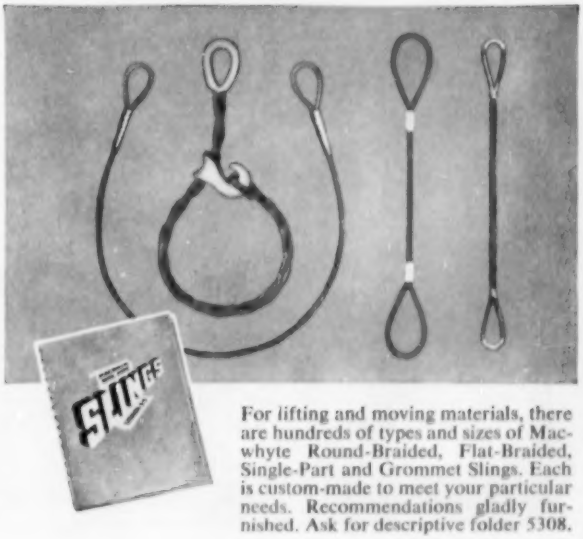

For lifting and moving materials, there are hundreds of types and sizes of Macwhyte Round-Braided, Flat-Braided, Single-Part and Grommet Slings. Each is custom-made to meet your particular needs. Recommendations gladly furnished. Ask for descriptive folder 5308.

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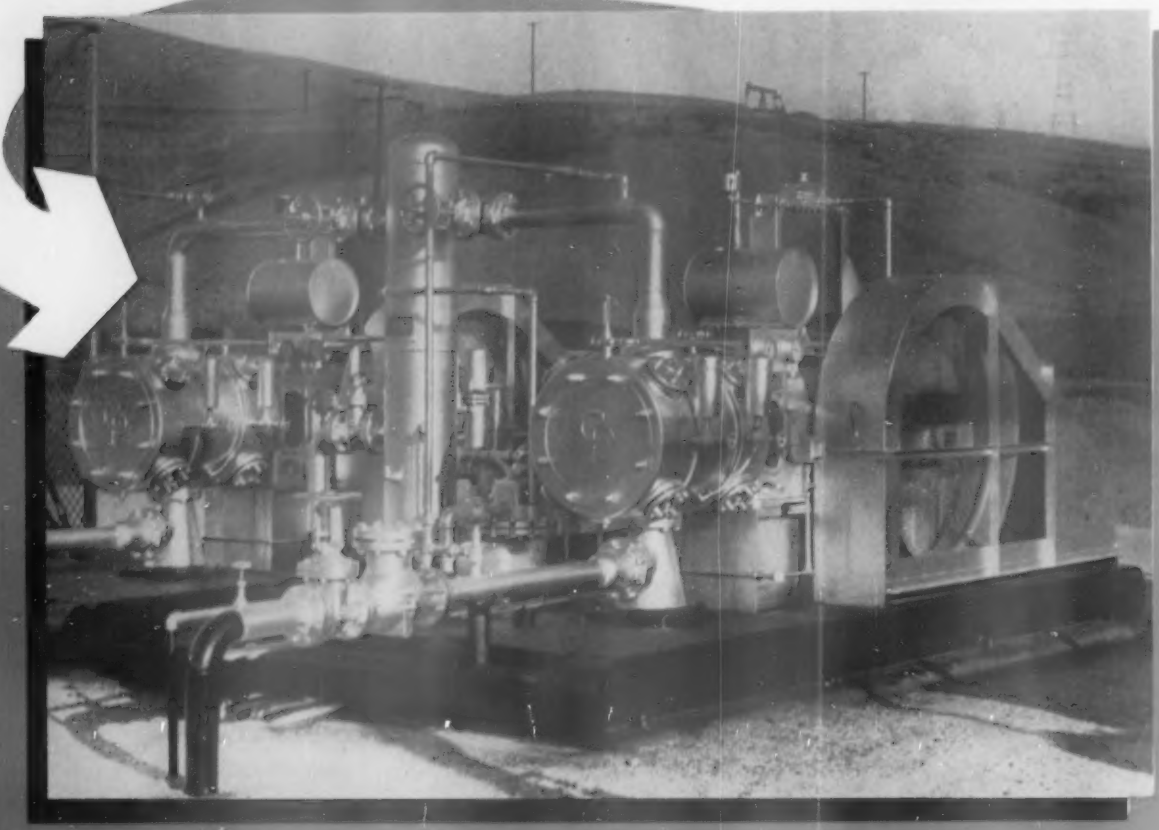
These "Oilwell" Compressor Units are SAVING Storage Tank Vapors



WHAT HAPPENS to the vapors which rise from the oil that is stored temporarily in field tank farms?

The engineers of Shell Oil Company knew that the value of the vapors lost from light oil storage tanks would repay the cost of a vacuum system.

So they worked out a hook-up on one of their field tank farms near Brea, California, where a gas trap is installed, in which the two 75 hp "Oilwell" Compressor Units (shown above) would draw off the tank vapors. Both units are skid mounted side by side and take suction on a common line through the scrubber.

From 10" to 15" vacuum is being pulled and gases are now being recovered at the rate of 400,000 to 700,000 cubic feet per day.

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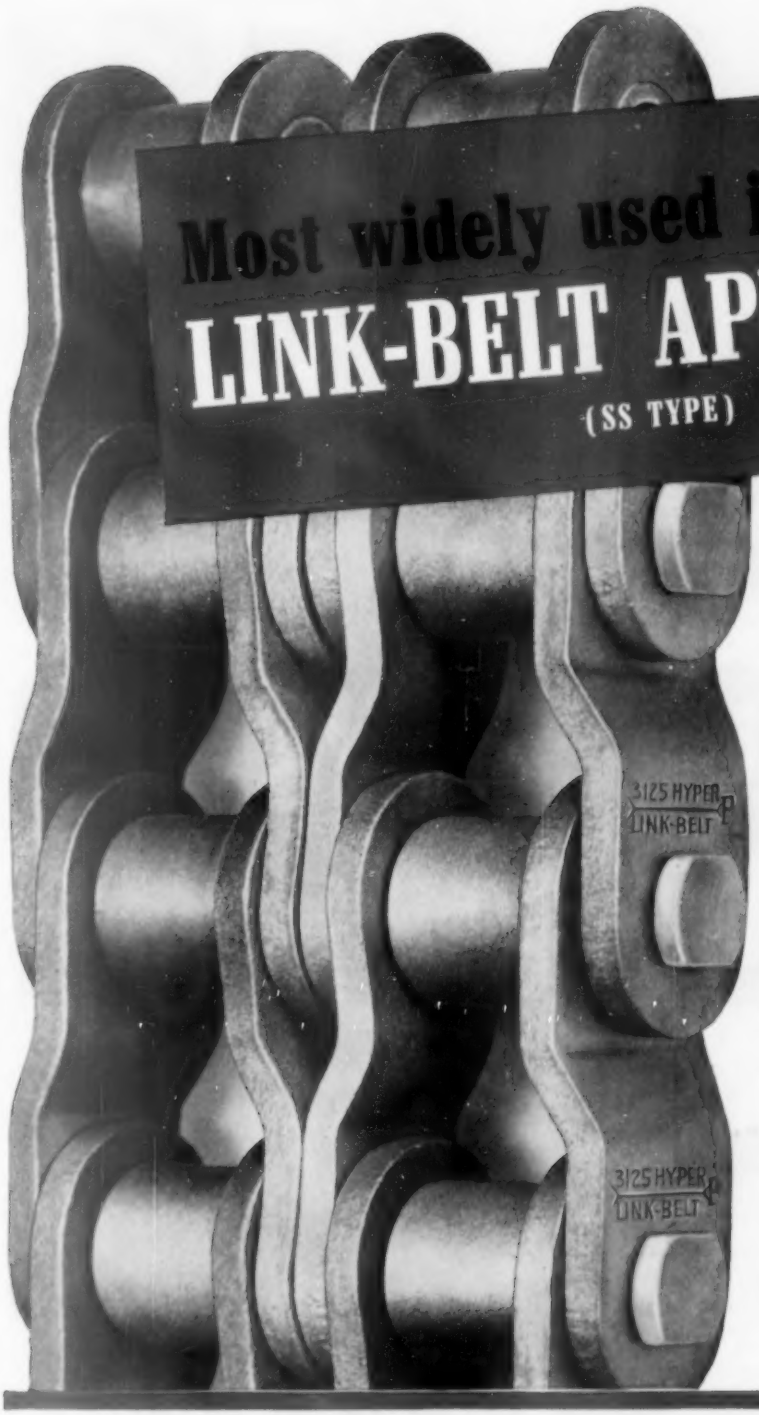
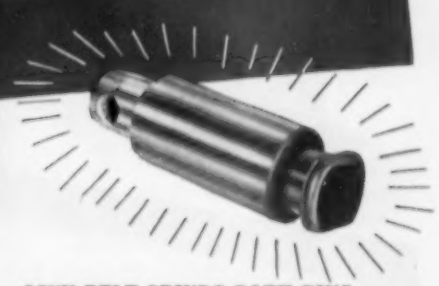




LINK-BELT GRINDS BOTH PINS AND BUSHINGS. Note the polished, satiny surfaces on these alloy steel parts. Grinding the pins and BOTH inside and outside of the bushings to a fine micro-inch finish eliminates wear-producing surface irregularities.

IT'S no secret why more Link-Belt API Chain (SS type) is bought and used than any other brand. In addition to *grinding* both pins and bushings, Link-Belt *shot-peens* the rollers of all API Chain. These and other extra manufacturing steps assure longer chain life.

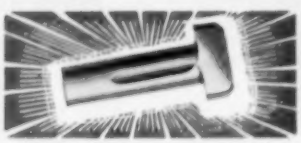
For the full story—ask for new Book No. 2580 on Link-Belt Oil Field Equipment. For facts on Link-Belt chain and other products, call your nearest Link-Belt office or any leading supply store in your field.

LINK-BELT

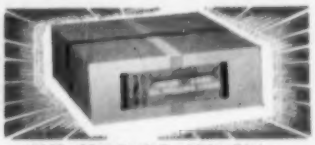
CHAINS and SPROCKETS 13.064

THESE AND OTHER 'EXTRAS' ARE YOURS WITH LINK-BELT API CHAIN

SHOT-PEENED rollers have been hammered by tiny steel balls—creating added ability to withstand shock and impact.



COTTERS have patented grooved shank affording tight fit in pin hole. Yet pin is easily removed or inserted. Cadmium plated.



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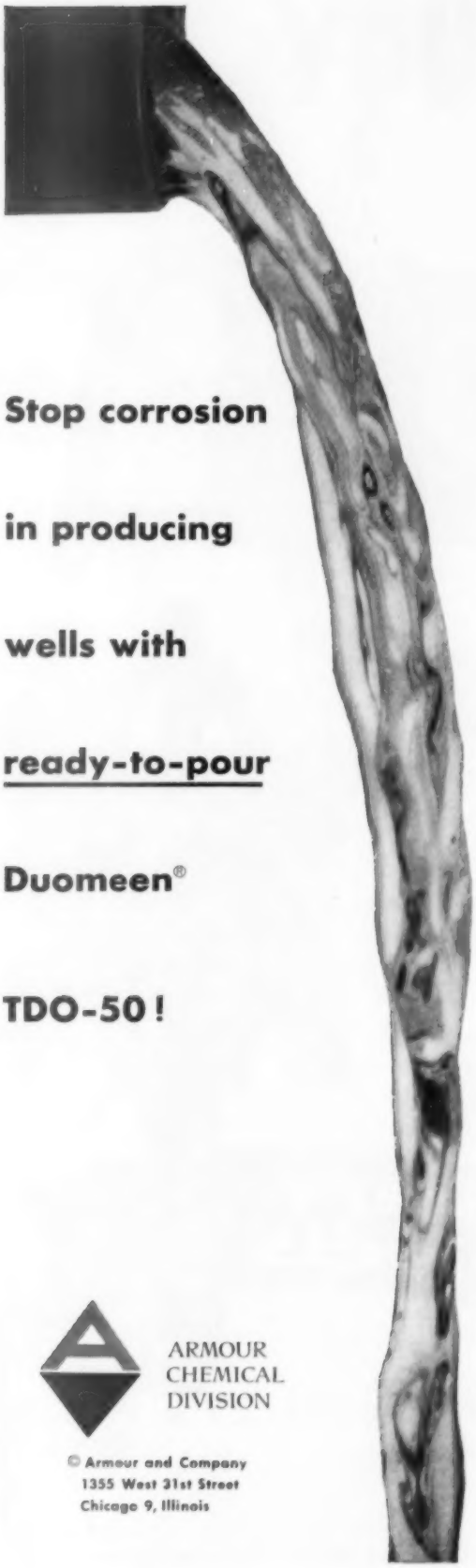

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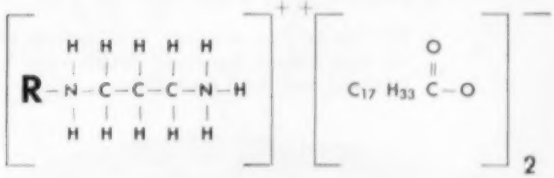
Structural Formula for Duomeen TDO:



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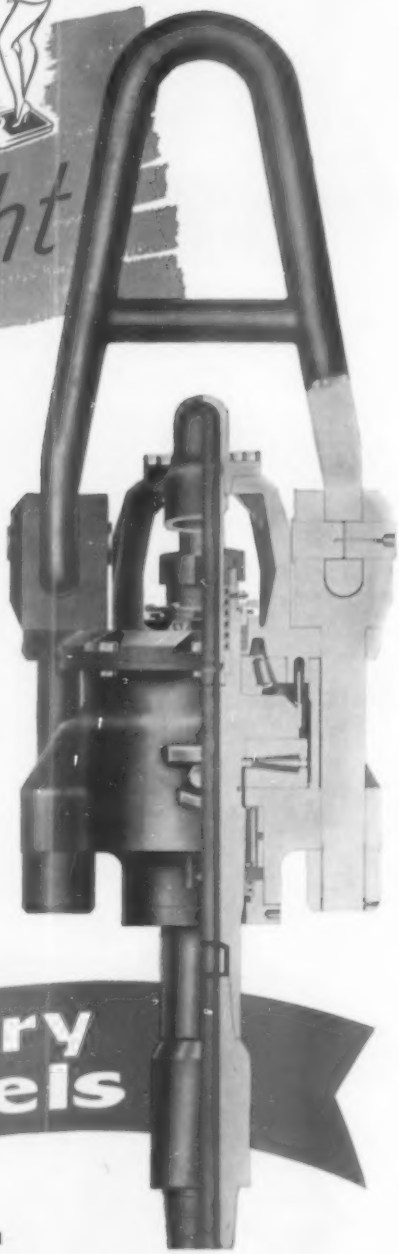

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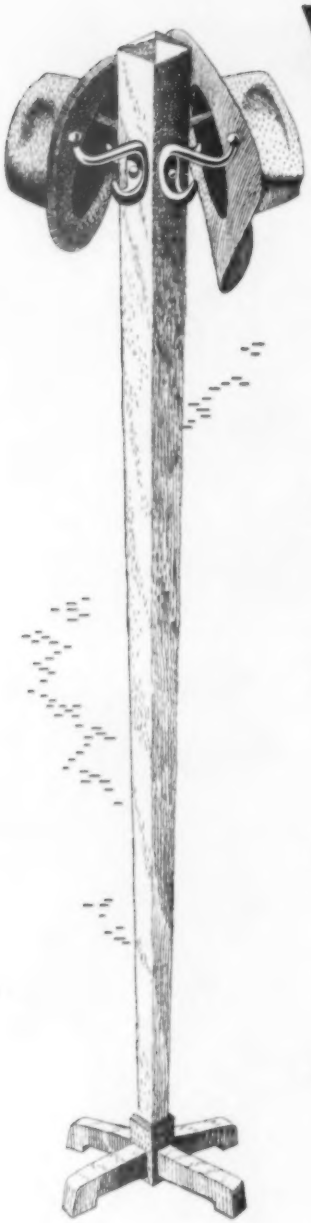

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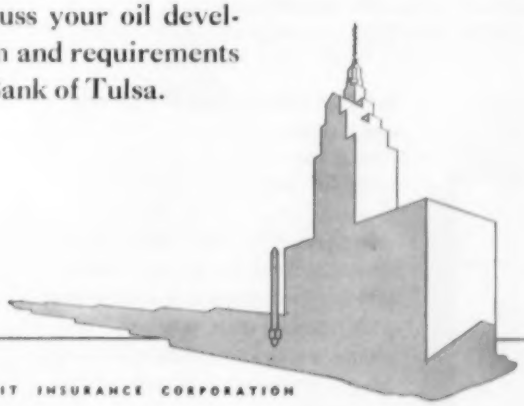

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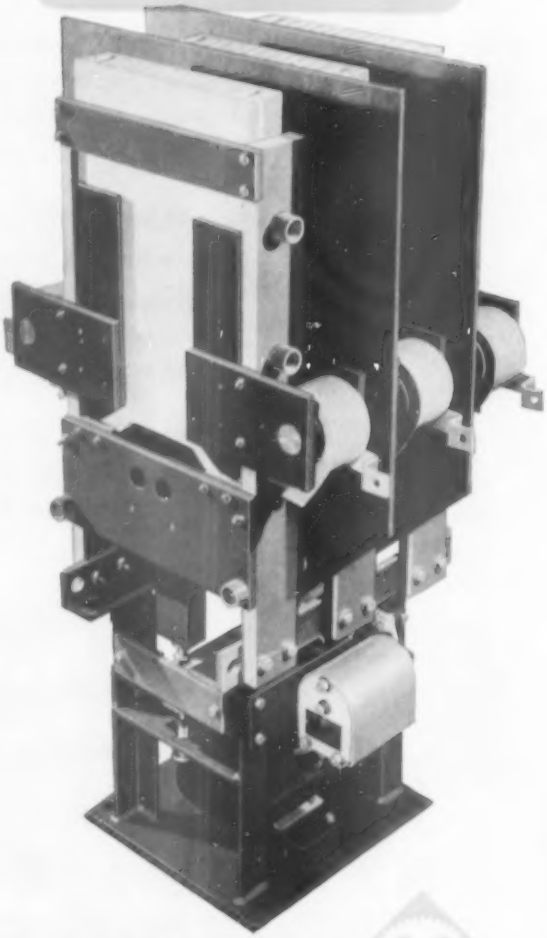

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For a general utility self-priming pump, you can't beat the Rex Speed Primer. Here's a rugged pump that's always "rarin' to go," even after long periods of hard use. It's simple, accessible, portable, has a positive, leak-proof seal, and is the only pump with an adjustable air peeler which assures new pump efficiency for the lifetime of the pump.

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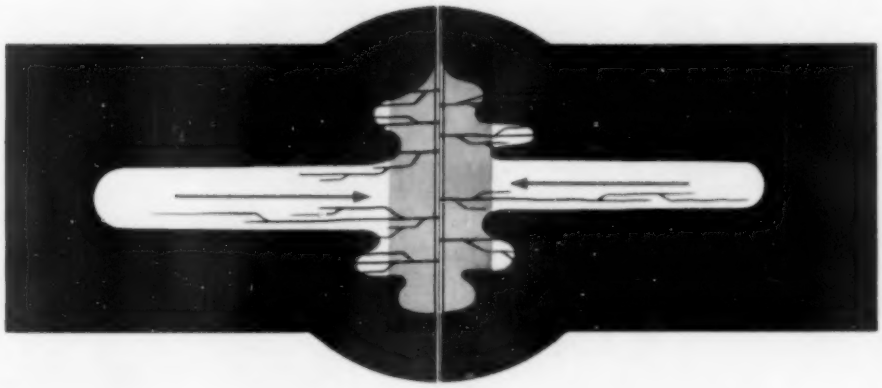

BLOCK BREAKER OPENS PLUGGED PAY ZONES

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Try MCA on your next well for removing water swollen bentonite, emulsion or water blocks that interfere with the normal productive flow of your well. MCA penetrates deep into the pay zones and helps restore normal permeability.

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DESIGNING • MANUFACTURE
CONSTRUCTION

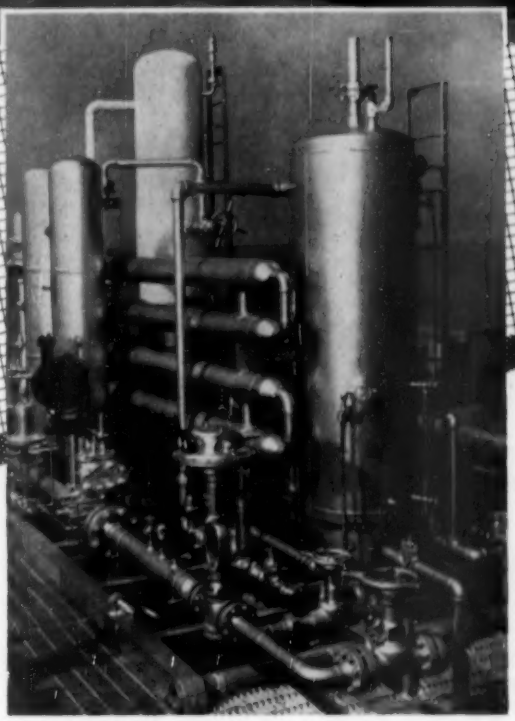
Continuous high efficiency was assured by all-weather design and construction of this plant for a major oil company at Lance Creek, Wyoming.

Stearns-Roger

THE STEARNS-ROGER MFG. CO. DENVER, COLORADO

DENVER • HOUSTON • SALT LAKE CITY • EL PASO

Engineered for individual installations PARKERSBURG HYRECO assures maximum benefits of cold separation



The outstanding and proven performance of Parkersburg Hyreco Gas Processing Units is the result of installations being engineered to meet the producing conditions of individual wells. Parkersburg engineers, specializing in cold separation, carefully analyze the conditions of your well and from this data they combine the standard elements of Hyreco into the one assembly that will deliver maximum efficiency on your well. Only the wide range and extreme flexibility of Hyreco, plus Parkersburg's technical experience and engineering skill, makes this individual installation designing possible.

Talk to your nearest Parkersburg representative for individually engineered Hyreco installations for your wells.

This off-shore installation of a 10MMCF Hyreco Unit is giving trouble-free performance and maximum efficiency, even though it frequently must operate at 20% above its rated capacity.

P.S. Parkersburg Service means research and engineering, consultation and technical proficiency for the development of improved products and processes for the oil and gas industry.

8403

PARKERSBURG
OIL FIELD EQUIPMENT

The Parkersburg Rig & Reel Co. Parkersburg, West Virginia
Division of Parkersburg-Aetna Corporation

HORIZONTAL AND VERTICAL SEPARATORS • HYRECO • KNOCKOUTS • SCRUBBERS • TREATERS • HEATERS

PHOTO COURTESY GORMAN-RUPP COMPANY, MANSFIELD, OHIO

gallons of water for thirsty acres with modern, thrifty **CHRYSLER V8** *hemispherical combustion*

With irrigation, every farmer and grower can virtually assure himself a record crop *every* year. The investment in pump, pipe and sprinklers pays for itself in a surprisingly short time.

Here is a Gorman-Rupp single-stage centrifugal pump designed especially for portable pipe irrigation systems. It is drawing 850 gallons of water per minute from the river to irrigate several acres of corn. To maintain this gallonage at 130 pounds pressure, its 331 cubic inch displacement Chrysler Industrial Model 24 V8 Engine is turning at only 76 per cent of its maximum governed speed.

Like other leading manufacturers, Gorman-Rupp picks the Chrysler Power that will match its equipment requirements. For example, smaller pumps are powered with Chrysler Model 30 and 16 Engines which deliver ample power for those units; but, since this Model 55M Pump was designed for high capacity pumping, Gorman-Rupp installs the 180-horsepower Chrysler Industrial Model 24 V8 Engine. Result of using this modern short-stroke, low friction engine: High water volume *plus* outstanding operating economy.

Regardless of the type of equipment you manufacture, if it requires industrial power within our 230 to 413 cubic inch displacement range, there's an economical power-proved Chrysler Industrial Engine to meet your requirements, and a long list of optional equipment items with which your engines can be factory-equipped for *better* specialized performance.

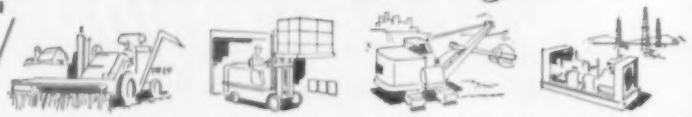
And remember, Chrysler Power is not expensive. Production-line methods adapted to specialized industrial engine building provide a custom-built engine at mass-production prices.

Before you install any engine, see a Chrysler Industrial Engine Dealer or write for detailed information: ***Dept. 146, Industrial Engine Division, Chrysler Corporation, Trenton, Mich.***

CHRYSLER *Industrial Engines*

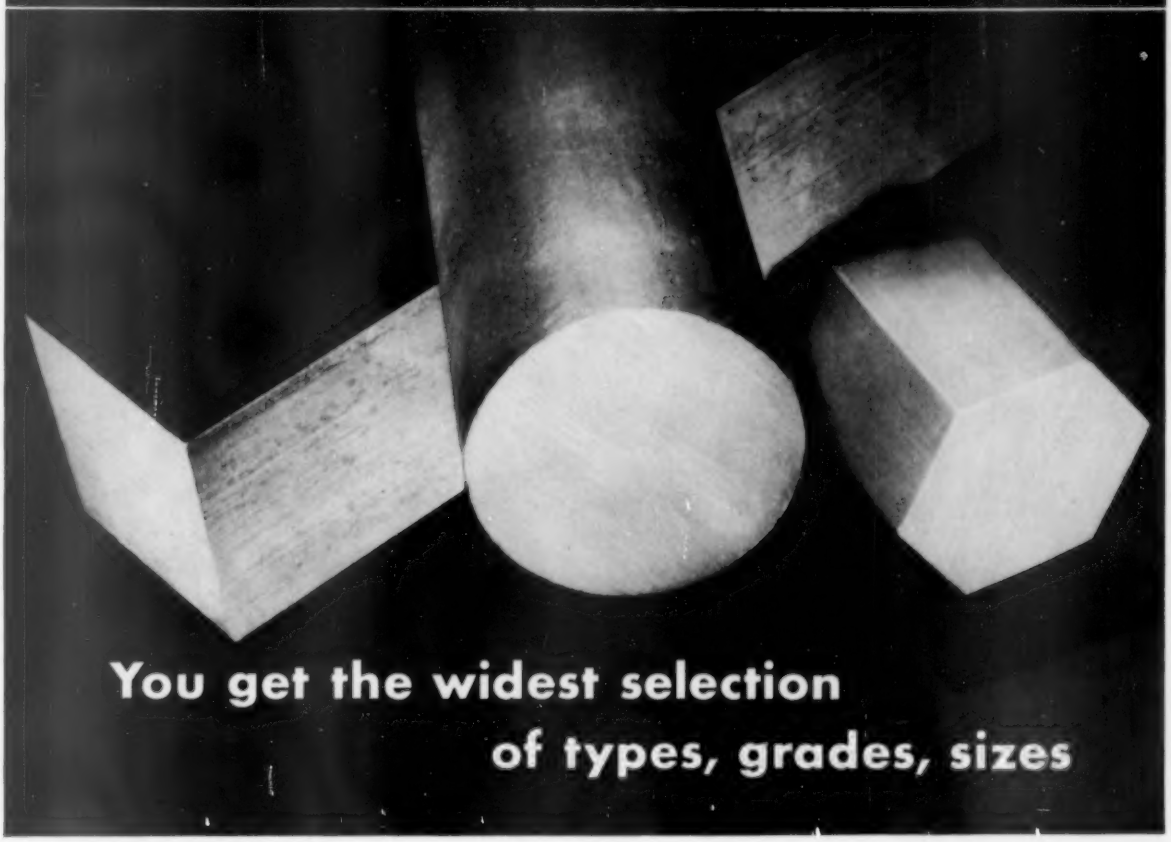
INDUSTRIAL ENGINE DIVISION • CHRYSLER CORPORATION

HORSEPOWER WITH A PEDIGREE



AGRICULTURE • INDUSTRY • CONSTRUCTION • OIL FIELDS

WHY IT PAYS TO BUY STAINLESS BARS FROM US



TRIPLE SECURITY

What you want
When you want it
At the right price

• You can greatly simplify your buying of stainless steel bars by calling the nearest U. S. Steel Supply warehouse. Our warehouses offer the widest selection of top quality bars ready for immediate delivery. These bars are made from USS Stainless Steel—produced under the strictest quality control from ore to finished product—so you're sure of getting the exact grade you specify.

In addition our large stocks provide greater design freedom for your particular needs. And our experienced stainless men are at your disposal to help you select the best grade for the job . . . and even to help you with design problems.

Call us for USS Stainless bars—rounds, squares, hexagons, angles, channels—and for stainless sheet and strip, too.

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Gentlemen:
Please send me, without obligation, your literature containing complete information on your stainless steel stocks and service.
Name.....
Company.....
Address.....
City..... State.....

NEMA-rated at 200 amps.
—but pulls 300 amps.!
Runs all day on one tank of gas!

Both engine and generator are mounted on a sturdy frame. Two-wheel mounting also available.

New P&H WN-250 Engine-Driven Arc Welder

Here you get everything you've ever wanted in an engine-driven welder — including cost-cutting features you don't get from any other.

(1) The P&H WN-250 has more capacity than other welders with the same rating.

(2) It has a full 20-gallon gas tank.

(3) It is powered by a direct-connected 180GLU Waukesha gasoline engine, water-cooled and built for heavy duty. Not an automotive light-weight. Available with electric starter.

(4) P&H idling device establishes the rated speed of 1800 rpm as soon as the arc is struck. This speed is maintained for a set period after the arc is broken.

(5) P&H Dial-lectric Control provides stepless heat adjustment over the entire high or low range.

(6) It has pre-lubricated bearings, to reduce the need for servicing and insure longer life.

(7) Auxiliary AC power supply (1KVA) permits floodlighting and running power tools.

You're money ahead with a P&H WN-250. Ask your P&H representative or distributor for all the facts. Or, write for bulletin.

P&H WELDING DIVISION
HARNISCHFEGER CORPORATION
4527 West National Avenue
MILWAUKEE 46, WISCONSIN

· Continuous 8-hour welding test demonstrates the extra stamina of the P & H WN-250

You can't beat welding performance like this · In a recent test, the P&H WN-250 operated continuously for 8 hours on a 70% duty cycle.

A 5/32" electrode was used with 300 feet of cable. There were 250 amps. at the electrode. So that test would be continuous, three welding operators were used. When one got tired, another took over. All used the drag technique with a 6010 rod—which is as close to a short circuit as you can get.

At the end of 8 hours, the P&H generator was still cool. And the WN-250 was still rarin' to go—the weldors were worn out, but not the machine.

the P&H *line*

25958

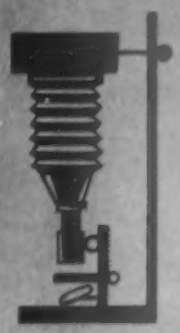
A beautiful picture...OF TROUBLE

Photomicrograph by J. G. Suthard

The above photomicrograph shows salt crystals in crude oil, magnified to seventy times actual size. When salts such as these get into refinery equipment, the picture isn't so pretty. Salts in the crude charge invariably result in a substantial decrease in refining efficiency. The only protection against them is effective desalting. You get it, with

PETRECO®
ELECTRIC DESALTING

D54-1



The photomicrograph on the reverse of this page was made as a routine step in Petreco's never-ending study of salts in crude oil and their effects on refining operations. When you consider the merits of a desalting process, it is well to give considerable thought to the calibre of the organization offering the process. Petreco pioneered electric desalting and can back Petreco processing with the know-how resulting from nearly half a century of electric processing experience.

Petreco desalters guard your refinery, day and night, against shutdowns caused by salts, solids and BSandW in the crude charge. You can't get better protection, because you can't get better desalting.

ELECTRIC PETROLEUM PROCESSING

DESALTING • DEHYDRATING
SEDIMENT SEPARATING
DISTILLATE TREATING
DESAPONIFYING

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D54-1

UNIBOLT

Flow-rated "X" beans

Christmas tree equipped with UNIBOLT Flow Manifold, consisting of UNIBOLT Tee, Wing Valve and Positive Choke Body.

YOUR INSURANCE AGAINST HARMFUL OVER-PRODUCING

UNIBOLT Flow Rated X-Beans, provide control of the flow of fluid or gas with a degree of accuracy never before attained. They are drilled in increments of 5 percent and 10 percent of well flow, rather than in increments of 1/64-inch, and are individually flow-rated to assure accuracy.

If, for example, a well produces 10 bbls. through a conventional 5/64-inch choke, to increase the choke to the next largest fractionally drilled size, 6/64-inch, would increase the production to approximately 15 bbls. On the other hand, a well that produces 10 bbls. through a size X-23 UNIBOLT X-Bean would produce only 11 bbls. through the next largest size X-Bean, X-24; 12 bbls. through an X-25, and so on.

This accurate control of production is a safeguard against the harmful effect of periodically pulling a well too hard in order to make its allowable.

GAS PRODUCERS are benefiting from the use of "X" Beans because the wells can be set with a positive choke for any desired rate of production.

THORNHILL UNIBOLT CRAVER CO.

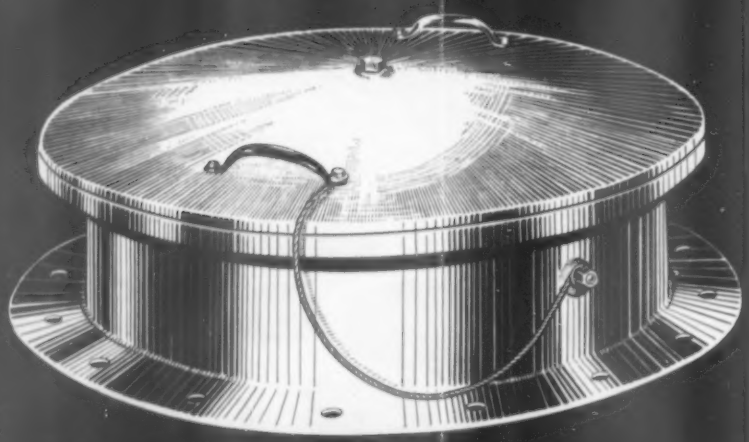
P. O. BOX 1184 • HOUSTON, TEXAS

ALL WEATHER
Emergency Vent...

The new Shand & Jurs 20" Emergency Vent is designed for mounting right on a 20" A.P.I. Standard manhole. It incorporates a unique pallet construction which utilizes a pliable, reinforced, synthetic rubber coated Safety Seal Ring which provides the tightest possible seal. This assures minimum vapor loss at tank pressures less than the vent setting.

The Safety Seal Ring design provides a peeling action between the pallet and the seat which overcomes sticking or freezing to a very marked degree. When serious freezing hazards exist, a special Safety Seal Ring of Teflon coated fiberglass may be used. The Safety Seal Ring also resists chemical action of additives which provides longer dependable service. Designated by S&J Fig. ST-5455, this Emergency Vent serves as a quickly removable manhole cover and as an automatically self-sealing Emergency Vent.

Pallet and Seat detail illustrated above: In operation, tank pressure is directed through ports to the chamber back of the safety seal ring and produces a slight ballooning to effect a perfectly tight joint at all pressures below that for which the vent is set to open.



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V.I.P. treatment

You won't find it described in the books on metallurgy. But it's a mighty important factor here at Claymont in supplying you with carbon and alloy steel plates that are tailored to your specialized requirements.

To us it means *Very Important Plates.* It means individualized supervision of your order . . . particular attention to every detail of analysis, processing and inspection—right down the line from top to bottom.

Let us know your requirements—large or small. Our location in the heart of the Delaware Valley gives us complete access to convenient rail, water and highway transportation . . . enables us to efficiently and economically serve your needs.

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At a cost comparable to conventional compressor piping - you can install a GUARANTEED Fluor Pulsation Dampener Piping System*

On new construction we can fabricate and install a complete Fluor Pulsation Dampening Piping System that prevents compressor pipe vibration, at a price almost identical with that of a normal system of conventional piping.

How can we do it? Because we've been in the pipe dampening business a long time. We pioneered the use of piping systems based on scientific acoustical principles applied to fluid flow. We've learned from experience: since 1943 we've put into service 351 Fluor dampening installations throughout the world. We know that when we install a system we can guarantee it without equivocation. In plain words, we know our business.

To save time and costs on these jobs, Fluor maintains two well-equipped pipe fabricating shops—one at Los Angeles and one at Paola, Kansas. Fluor has perfected streamlined techniques for designing and building dampening systems—has the volume production to cut manufacturing costs—possesses the necessary experience to offer a better integrated unit at a price comparable with any normal system.

In addition to getting an economical "packaged" piping system free from vibration, you get many plus advantages in a Fluor designed system: more accurate flow measurement, lower maintenance costs, greater safety to personnel and elimination of vibrational stress on heat exchangers, vessels and related equipment. If the cost of a Fluor dampening piping system is measured by these advantages, then it is certainly one of the most economical buys in compressor plant equipment, today.

Fluor has something very definite to offer you—something far superior to any substitute method of reducing pulsation in pipe. Why not call us for an estimate and find out.

For information on Fluor Pulsation Dampener Piping Systems, write for Bulletin PDS-8501-R.

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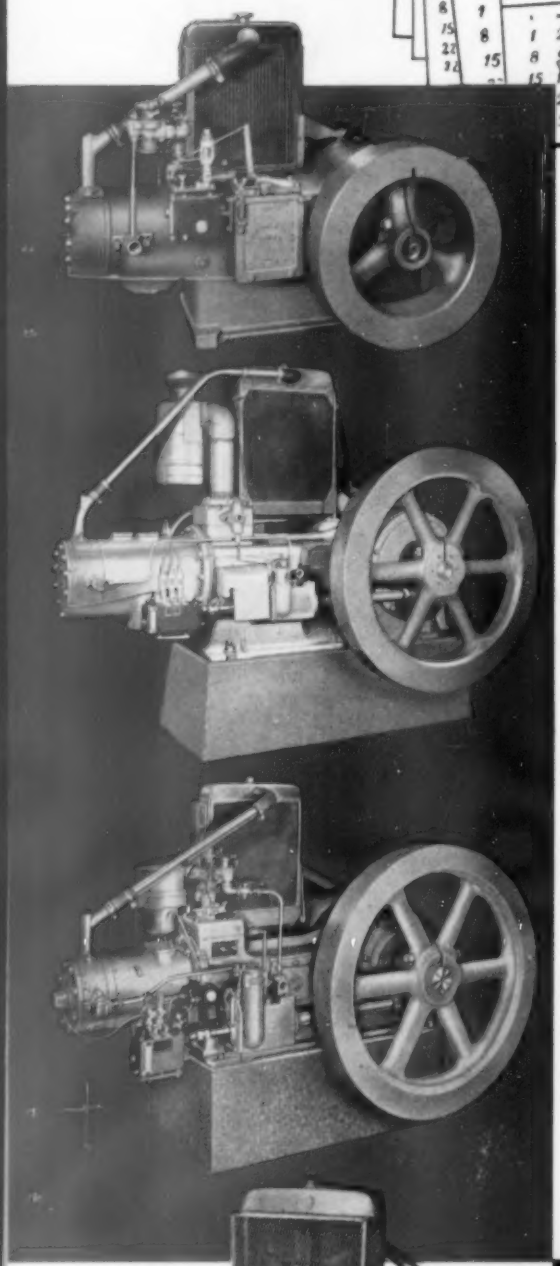
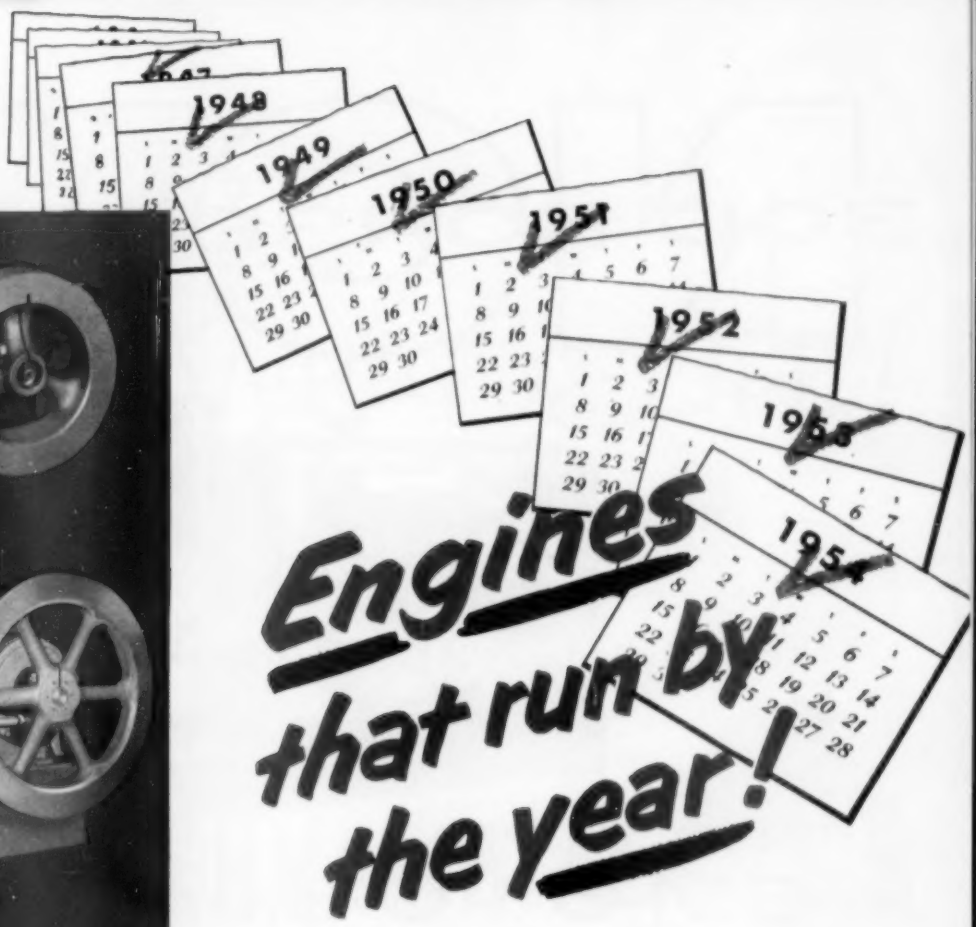
*U.S. Patents: 2,405,100—2,474,555—2,620,969





Engines that run by the year!

Your sturdy AJAX Engine—turning steadily, powerfully, smoothly under load—will maintain its pace by the month and year with little attention and even some neglect thrown in!

That's because AJAX is an *oilfield* engine all the way. It is built for seldom-visited operation in remote leases, as well as right under your thumb—glad of an annual oil change if you'll be so good, and requiring an on-location overhaul only at very long intervals.

Any model AJAX will work like that for you. And you've got the industry's only COMPLETE LINE to choose from. Write us for descriptive bulletins—and see your Supply Man for a full discussion of your needs.

AJAX

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AJAX IRON WORKS

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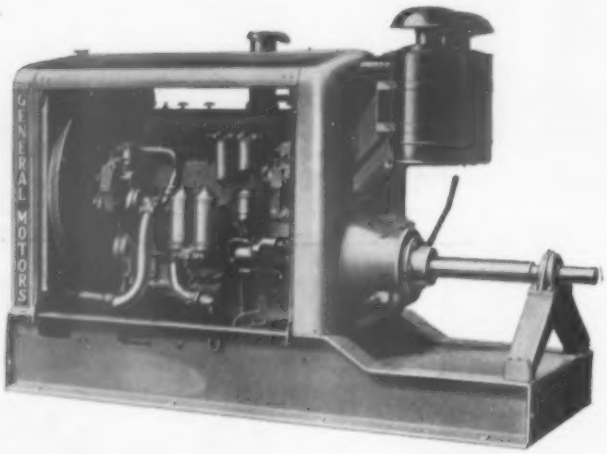
NOW 300 HORSEPOWER



in GM "6-110" diesel engine

Improved Design Gives Still More Power Per Pound From Same Size Unit

Want more power—and production—from your heavy-duty equipment?

Stymied because you can't fit a higher-horsepower Diesel into your units?

Now you can get the power you need—and the increased production you want—with a new 300-horsepower General Motors "110" Diesel—the engine that delivers more torque in the working range. And, you can get them with no increase in engine size or weight.

Higher horsepower means faster operating speeds—high torque means more working power—for operators of all kinds of heavy-duty units.

In off-highway trucks this combination means better hill-climbing, more trips per day, bigger pay loads.

In shovels it means faster digging and loading, more yardage, lower maintenance costs.

In drilling rigs it means more hole per day, faster round trips.

In tractors it means more power for pulling, pushing or "dozing."

Get full details on the new, more powerful GM Series 110 Diesels from your GM Diesel distributor. Have him show you that GM Diesels cost less to buy, less to run and less to maintain than any other Diesel.

GM
GENERAL MOTORS
DIESEL POWER

DETROIT DIESEL
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Single Engines . . . 16 to 300 H.P. Multiple Units . . . Up to 864 H.P.

WHAT A LIFE!

This conch shell spends its life in some of Nature's most persistently destructive elements—sand and salt water. And it successfully combats the constant attacks of these elements because of a high resistance to corrosion and abrasion.

KENNAMETAL* BALLS and SEATS

Like conch shells, Kennametal Balls and Seats last longer in highly corrosive and abrasive elements. Their service life in flour sand cut fluids, hydrogen sulfides, and sulfur far surpasses that of any of the "special" alloys. Operators are able to get more than 5 times longer valving service. Risk of bottom-hole valve failure is further reduced by Kennametal design features such as the "triple bevel" (shown on the seat at left), which increases shock resistance and provides a "funneling" action that keeps foreign matter from lodging in the seat.

If you have a "problem" well, remember to ask about Kennametal Balls and Seats. They are installed in the repair shops of most major pump manufacturers.

*Registered Trade Mark

KENNAMETAL* REDUCES THE RISK OF SUB-SURFACE VALVE FAILURE

Quality Sintered Carbide API Balls and Seats

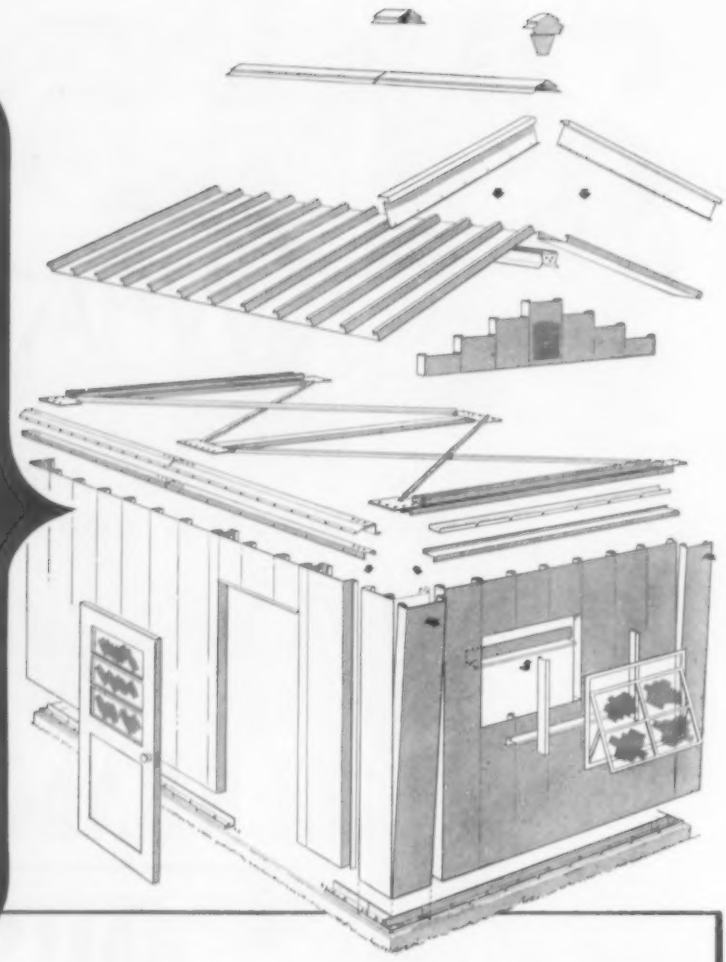
Manufactured by

Kennametal Inc., Latrobe, Pa.

SOLD BY MAJOR PUMP MANUFACTURERS

Here's why Armco Buildings

are easy to erect



In this "exploded" assembly drawing, you can see why Armco Steel Buildings go up quickly. A small crew, without previous erection experience, can handle the whole job. Installed cost is low.

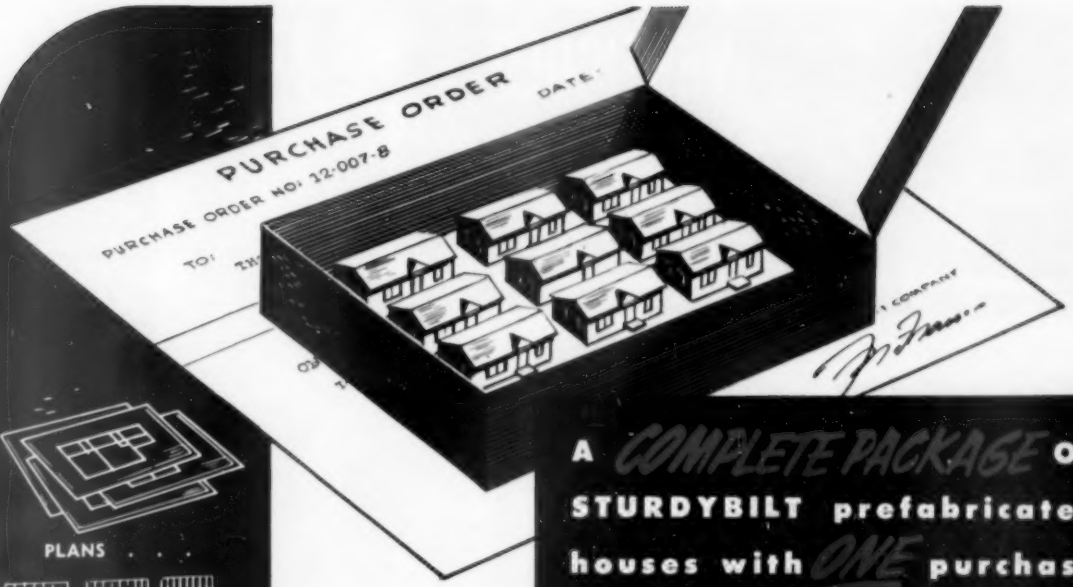
Assembly is principally a matter of fitting the unique STEELOX panels together to form walls and roof. Windows and doors can go almost anywhere. Bolts, inside of building, join sidewall panels at top and bottom.

Drawing also shows how STEELOX panels provide both structural support and smooth exterior with the same unit. In sidewalls, you save framing and exterior covering. On the roof, the panels replace rafters, sheathing and roofing. Assembled buildings are strong, wind- and weather-tight. And remember, steel won't burn.

With Armco Steel Buildings you can select the size you need—as small as 4′ wide by 5′-4″ long, or as large as 40′ clear-span width by any length. By using multiple structures, practically any building width may be obtained. Write us for further data and literature. Armco Drainage & Metal Products, Inc., 4124 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. Export: The Armco International Corporation.

Armco Steel Buildings

ARMCO®



A *COMPLETE PACKAGE* OF STURDYBILT prefabricated houses with *ONE* purchase order....

PLANS . . .

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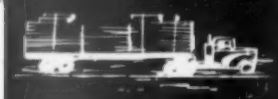


TRANSPORTATION TO SITE . . .

ERECTION

RESIDENCES • TOOL HOUSES • WAREHOUSES • GARAGES
OFFICES • DORMITORIES • RECREATIONAL HALLS • DINING HALLS

When you buy STURDYBILT Housing you have no worry about plans, construction, design or erection. One purchase order from you sets in motion the prefabricating, transportation and erection of practically any type of buildings you need. All you do is tell us what buildings you need and where they are to be located. We are your architect, contractor and builder. This is the fast, efficient and economical way to get the modern housing you need.

■ MANUFACTURERS OF SPECIAL MILLWORK: DISTRIBUTORS OF CURTIS WOODWORK AND JOHNS-MANVILLE BUILDING MATERIALS

WRITE FOR INFORMATION

STURDYBILT

PREFABRICATED, DEMOUNTABLE HOUSES

SOUTHERN MILL & MANUFACTURING CO. • TULSA, OKLAHOMA

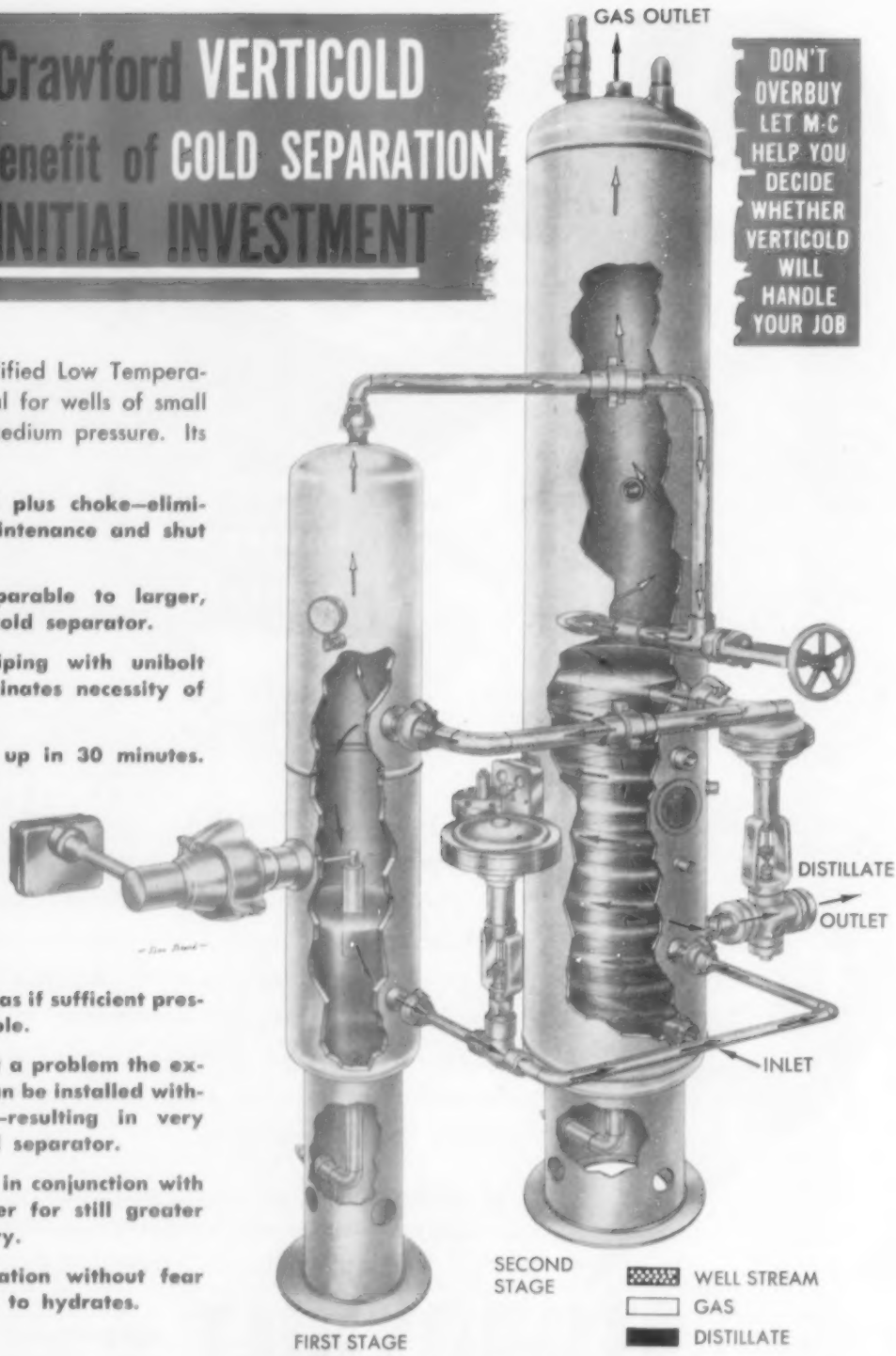
STURDYBILT HOUSES COMPLY WITH COMMERCIAL STANDARD CS125 OF THE NATIONAL BUREAU OF STANDARDS FOR PREFABRICATED HOMES

Maloney-Crawford VERTICOLD Provides Benefit of COLD SEPARATION at LOW INITIAL INVESTMENT

DON'T OVERBUY LET M-C HELP YOU DECIDE WHETHER VERTICOLD WILL HANDLE YOUR JOB

Verticold is a simplified Low Temperature Separator ideal for wells of small flow rate and of medium pressure. Its features are:

1. **Only 2 controls plus choke—eliminates costly maintenance and shut down.**
2. **Recoveries comparable to larger, more complex cold separator.**
3. **Prefabricated piping with unibolt connections eliminates necessity of skid.**
4. **Can be hooked up in 30 minutes.**
5. **Will dehydrate gas if sufficient pressure drop available.**
6. **If free water not a problem the expansion vessel can be installed without first stage—resulting in very inexpensive cold separator.**
7. **Can be installed in conjunction with a heat exchanger for still greater distillate recovery.**
8. **Continuous operation without fear of freezing, due to hydrates.**



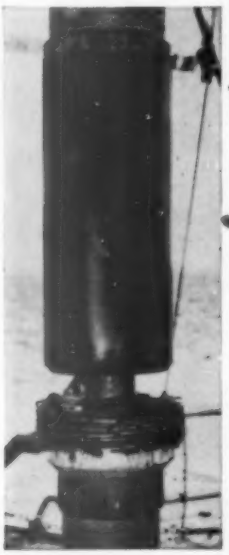
MALONEY CRAWFORD

MALONEY-CRAWFORD TANK & MFG. CO.

FACTORY AND GENERAL OFFICE: 38 North Peoria—Box 659—Tulsa, Oklahoma.
EXPORT REPRESENTATIVE: Baird Lines, 420 Lexington Avenue, New York, N. Y.
CANADIAN REPRESENTATIVE: Maloney-Crawford Tank & Service Company, Ltd., Edmonton, Alberta.
TEXAS PANHANDLE REPRESENTATIVE: Atlas Tank Company, Pampa, Texas.

NOW - only JOHNSTON provides this new, field-proven testing method!

with BOB TAIL PACKER and HYDRAULIC TESTER



THIS . . . Actual photo of the new Bob Tail Packer coming out of the hole without any extrusion or flow of the rubber packing element!

NOT THIS . . . Typical example of the extrusion that occurs on conventional packers — now practically impossible with the new Bob Tail Packer!

BOB TAIL PACKER

Absolutely Prevents Extrusion! You get the tightest seal it's possible to produce . . . a **perfect** seal. With the Bob Tail Packer there's **no** extrusion, **no** flow of the rubber packing element! Here's why the new Bob Tail Packer makes such a big difference:

★ **Pack-Off Is Up To 30% More Effective!** Metal petal cups at base of packer hold the rubber in the pack-off zone! Rubber **can't** flow or extrude down the lower packer assembly!

★ **Up to 3 Times MORE Clearance** when going in the hole. The Bob Tail utilizes entire volume of rubber in the pack-off zone. Loses none to extrusion—so a much smaller diameter is effectively used.

★ **Removes Easily From Packer Seat** after the test is completed, rubber is intact, thanks to the special design.

Type B Hydraulic Tester prevents shock to formation, pipe and instruments and needs **less** water cushion!

TYPE B HYDRAULIC TESTER

Prevents Shock To Test Zone by releasing pressure **slowly** below the packer! The Type B Hydraulic Tester opens in stages during 2½ to 4 minutes . . . allows spudding through tight spots you may find in open or uncased hole!

Positive Operation for Positive Interpretation! The compact, self-contained Johnston Hydraulic Tester opens by applying drill pipe weight, closes by removing weight! Functions smoothly **every** time—reduces plugging and damage to wall of hole.

See The Difference this super-accurate testing team can make for you! Remember, it's always Johnston **first**—in speedy service, in new developments for **accurate** testing!

JOHNSTON TESTERS

first in drill stem testing

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C0542

For the extra performance on special

National's F-60 Triplex Pump for either high or low pressure service

Model Number	Rated Discharge Pressure Range*	Barrels Per Day Range*
F-60-L (Low Pressure)	835 to 1575 psi	1120 to 4230
F-90-L (Low Pressure)	685 to 1345 psi	1955 to 7715
F-60-S (High Pressure)	1575 to 4975 psi	355 to 2240
F-90-S (High Pressure)	1660 to 5375 psi	480 to 3190

*Based upon standard pump speeds and rated HP output.

National's F-90 Triplex Pump for either high or low pressure service

pumping jobs!

NATIONAL TRIPLEX PUMPS

Combining new rugged pump construction with compact, efficient design, the National horizontal triplex plunger pumps bring exceptional performance to a variety of oil field and petrochemical pumping jobs.

Developed primarily for water-flooding, salt water disposal and as a power- oil source for subsurface hydraulic pumping systems, National Triplex Pumps handle a wide range of pressures and volumes. And, fluid ends and plungers can be provided for either corrosive or non-corrosive service.

In operation, simplified, modern construction assures you round-the-clock, maximum performance, week after week, with little or no attention. And for the reduction of down-time for maintenance, these National Triplex Pumps feature easily removed stuffing box cartridges* and complete valve interchangeability.

Look over all the facts on National Triplex Pumps for your special pumping jobs with the National Supply Representative or Store in your area soon.

*Patent Pending

NATIONAL BLUE PRODUCTS

First in quality . . . First in supply service . . . in oil country everywhere

THE NATIONAL SUPPLY COMPANY

PITTSBURGH 30, PENNSYLVANIA

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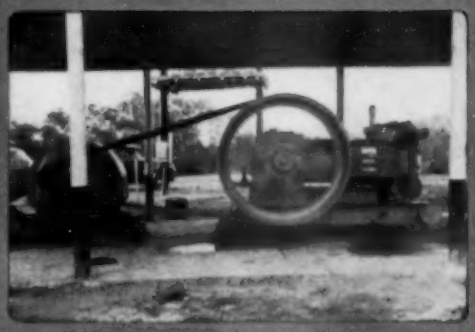
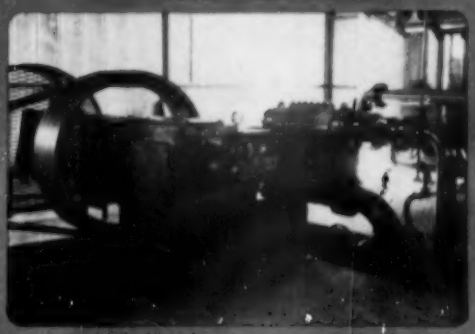
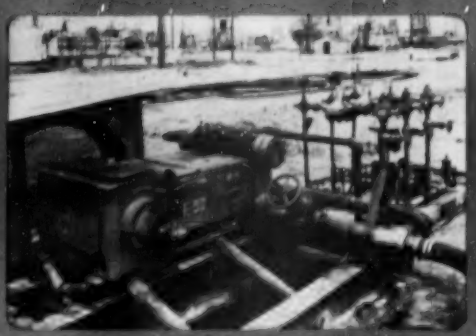
Canada: The National Supply Company, Ltd., 200 F. W. Clark Building, 709 Eighth Avenue, West, Calgary, Alberta
Export: 600 Fifth Avenue, New York 20, N.Y., U.S.A.; River Plate House, 12 South Place, London E.C. 2

NATIONAL OIL FIELD MACHINERY AND EQUIPMENT
SPANG STEEL PIPE • SUPERIOR & ATLAS ENGINES







For water-flooding, salt water disposal, power source for subsurface hydraulic pumps, high-pressure testing, oil gathering, formation fracturing and acidizing

Workman pours 25 lb. bags of phenolic resin spheres into hopper.

Diagram at left shows system for introducing spheres into oil storage tank.

In one hour, oil tank gets new vapor-sealing floating blanket

At an oil station in Texas recently, it took less than an hour to install a covering of Microballoon*spheres on the oil in a 10,000 barrel tank. Half an inch thick, this floating blanket will cut evaporation loss 80-90 per cent.

The tiny hollow spheres of BAKELITE Phenolic Resin, microscopic in size, resemble finely ground reddish-brown flour. Pumped in with the oil, they float to the surface, forming a cover that rises and falls with the oil level, keeping it sealed. Cost may be repaid within a year by savings in evaporation loss.

Learn more about this new method of stopping evaporation loss. Write Dept. XO-64 for free booklet describing BAKELITE Phenolic Resins for oil evaporation control.

*Trade-mark Standard Oil Company (Ohio).

BAKELITE
TRADE-MARK
PHENOLIC RESINS
TRADE (B) MARK

BAKELITE COMPANY, *A Division of Union Carbide and Carbon Corporation* UCC 30 East 42nd Street, New York 17, N. Y.
In Canada: Bakelite Company, Division of Union Carbide Canada Limited, Belleville, Ontario

another page from Tuboscope Research

Tuboscope COMPANY

Sucker Rod Analysis

MAXIMUM USEFUL LIFE FROM EACH ROD

PREVENT SHUTDOWN BREAKAGE

This latest product of Tuboscope research locates all physical, use-induced defects in sucker rods. Defects which cause failure and that cannot be found by conventional inspection methods are uncovered by this new technique. Based on experience gained in more than five years practical experience with Sonoscope in adapting electronic non-destructive principles to the inspection of oilfield tubular goods.

Defects are recorded in permanent graph form, assuring uniformity of inspection and eliminating the chance of human error. Corrosion pitting, cracks, handling defects or radical strength variations in the material, due to improper normalizing, are all charted accurately. Breakage of rods, shut-down time and loss of production are reduced by this inspection. Ask your Tuboscope man to show you the savings from periodic rod inspection of your wells.

TUBOSCOPE COMPANY
2400 HOLMES ROAD
HOUSTON, TEXAS

Our Service Is Your Protection.

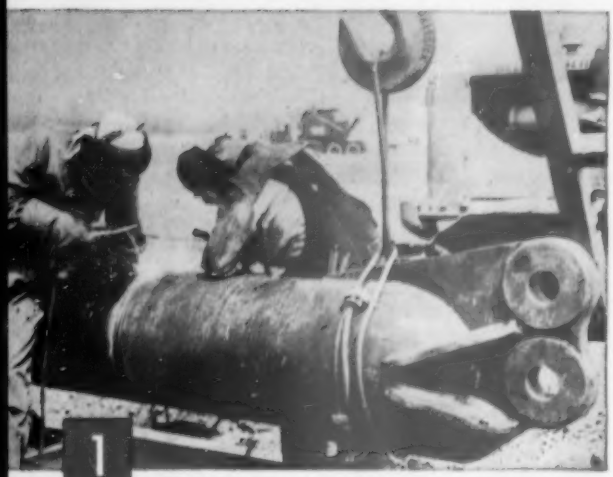
*The trade marks Tuboscope and Sonoscope are registered in the U. S. Patent Office.

LEADER IN NON-DESTRUCTIVE TESTING IN THE PETROLEUM INDUSTRY

The remarkable story of

"OPERATION

the world's deepest



1

"OLD BULLHEAD," the watertight pulling dome, being welded to the first length of pipe. The 4-mile pipeline was pulled across the Straits by a powerful winch which was set in a concrete foundation approximately 2,700 feet from the water's edge on the Mackinaw City side.

2

A SECTION of the extra-heavy $1\frac{3}{16}$-inch wall National Seamless Pipe being prepared for welding. The pipe is resting on one of the Collins rubber-tired launchways.

3

THE FIRST SECTION of pipe ready for launching at St. Ignace, Michigan. On the water, in the background, is a dredge which assisted in the pulling operation. At the left is the Control Tower, nerve center of all operations during the "Big Pull."

4

MAKING A TIE-IN WELD between two of the 2500-foot sections of National Seamless. As each section was launched, a new section was welded to it, until all eight 2500-foot sections had been welded into one continuous 20,000-foot line of National Pipe.

BIG PULL"

submarine pipeline crossing

SOUND planning, a world of technical know-how, and the utmost care in selection of materials made possible the "Big Pull"—Lakehead Pipe Line Company's two 20-inch crossings of the 4-mile wide, 250-foot-deep Straits of Mackinac—the deepest and longest submarine lines ever laid.

Ingenious systems and devices had to be created for dredging, launching the pipe, adding buoyancy, pulling the pipe, filling it, and releasing the pontoons after the pipe was laid. Bad weather and rough water had to be overcome. The work, both ashore and afloat, had to be closely synchronized via a radio-telephone network, providing constant two-way communication as the pull progressed. And, of utmost importance, the pipe used had to have the unusual combination of high strength, extreme flexibility and maximum uniformity. It had to resist great pressures, absorb distorting and bending stresses; it had to have superior welding qualities; and for years to come it will have to be "trouble-free"—completely dependable. National Seamless Steel Pipe met these requirements and was the ultimate choice.

Twenty-seven foot lengths of 20-inch OD National Seamless Pipe, 13/16-inch wall, were welded into eight sections, each approximately 2,500 feet long and weighing 220 tons. The pipe was coated and wrapped with two layers of fibre glass matting, and the lower perimeter was sheathed with timber lagging to protect it from possible damage as it scraped the bottom of the Straits.

The first of the two 4-mile sections of pipe was pulled across the Straits in just less than seven days. The second crossing was accomplished in only 65 hours and 5 minutes. Bechtel Corporation of San Francisco, California, as the agent for the Lakehead Pipe Line Company, Inc., managed the history-making crossing, which was completed by Merritt-Chapman & Scott Corporation, general marine contractors; and Collins Construction Co. of Victoria, Texas, submarine pipeline specialists.

NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION
PITTSBURGH, PA.
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

5 **STRAPPING FLOAT** to section of 20-inch pipe being pulled across the Straits. Floats were placed at 66-foot intervals to prevent heavy pipe from dragging on the bottom. With floats attached, pipe had a negative buoyancy of six pounds per foot.

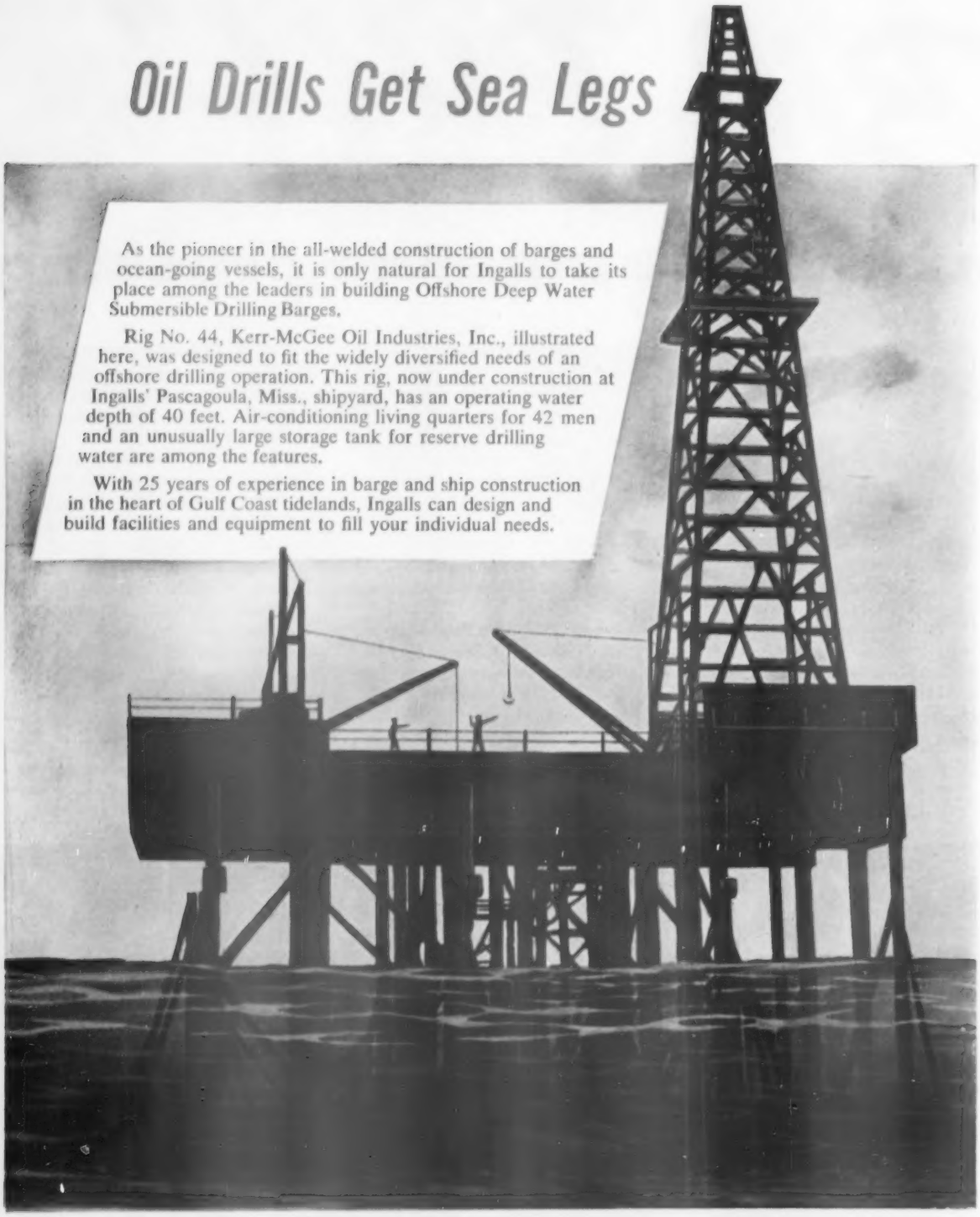
6 **"OLD BULLHEAD,"** just after it emerged from the water at the south shore (Mackinaw City) landing site. It was greeted with triumphant shouts and a champagne christening by executives and employees involved in the operation.

USS NATIONAL SEAMLESS PIPE AND TUBES

USS

UNITED STATES STEEL

Oil Drills Get Sea Legs



As the pioneer in the all-welded construction of barges and ocean-going vessels, it is only natural for Ingalls to take its place among the leaders in building Offshore Deep Water Submersible Drilling Barges.

Rig No. 44, Kerr-McGee Oil Industries, Inc., illustrated here, was designed to fit the widely diversified needs of an offshore drilling operation. This rig, now under construction at Ingalls' Pascagoula, Miss., shipyard, has an operating water depth of 40 feet. Air-conditioning living quarters for 42 men and an unusually large storage tank for reserve drilling water are among the features.

With 25 years of experience in barge and ship construction in the heart of Gulf Coast tidelands, Ingalls can design and build facilities and equipment to fill your individual needs.

Artist's Conception of Rig No. 44

BUILDERS OF:

TANKERS • OIL BARGES
MARINE EQUIPMENT
OIL DRILLING BARGES
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PROCESS EQUIPMENT NEWS

PUBLISHED BY FABRICATED PRODUCTS DIVISION, THE M. W. KELLOGG COMPANY JUNE-JULY 1954

More Fizz for New York's Sodas

More carbon dioxide—for use this summer in carbonated beverages bottled in the New York area—is the worthy purpose behind this condenser, shown below during the tube loading operation in Kellogg's shops earlier this Spring. During the hot weather season it condenses some 30,000 pounds of carbon dioxide an hour, enough to supply the fizz in something like seven million bottles of soda pop.

On the technical side, one of the more unusual service conditions for the condenser is an extreme pressure differential of over 1300 pounds per square inch. Carbon dioxide on the shell side will be held at a pressure of 1400 psig. Water will circulate in the tubes under a pressure of 80 psig.

The unit will consist of two shells, each with 250 tubes, ¾ inch in outside diameter by 20 feet in length. The two sections are of forged, integral-channel, fixed-tube-sheet construction with admiralty tubes and steel shell cover, channel, and tube sheets.

For further information, inquiries or comments are invited

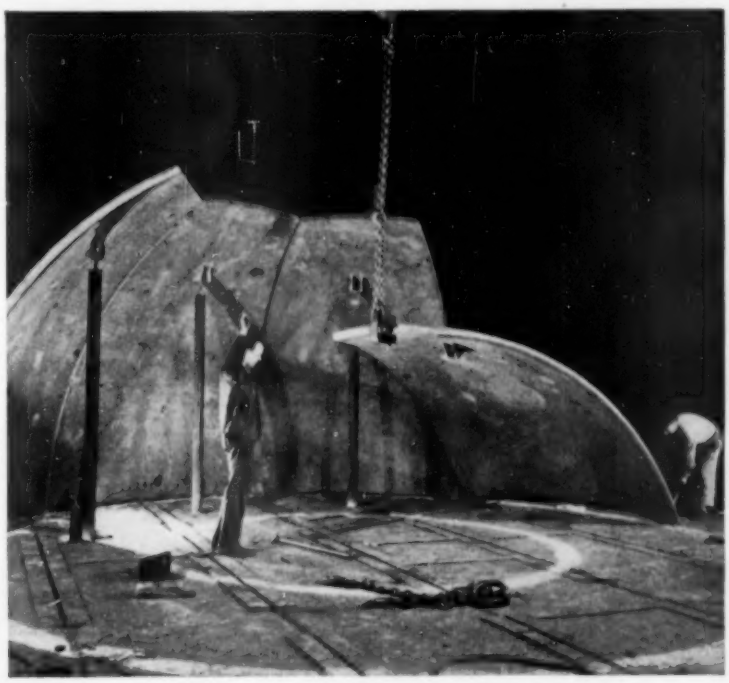
FABRICATED PRODUCTS DIVISION

THE M. W. KELLOGG COMPANY

225 Broadway, New York 7, N. Y.

or offices in Jersey City, Buffalo, Los Angeles, Tulsa, Houston, Toronto, London & Paris

KELLOGG PULLMAN



Mammoth Pressure Vessel for Oil Refinery to Be World's Heaviest

The world's heaviest process vessel, and one of the largest ever built, is now being fabricated in the Kellogg shops at Jersey City. When completed, the vessel—it comprises the reactor and regenerator of a unique Fluid Hydroforming plant—will stand well over 200 feet high and weigh approximately 650 tons.

Knockdown assembly of certain portions as well as complete fabrication of others will be accomplished in the shop before the various sections are shipped to the field for installation.

The illustration above shows the pressed head sections, cut to exact size, being joined together. The four "orange-peel" sections form half of the bottom head of the vessel. After the other half of the head is fabricated in the same manner, the two halves will be fitted up and match-marked in the shop, then shipped to the job site for final assembly.

The reactor vessel, which will be approximately 135 feet high and have an internal diameter of 23½ feet, will be topped by a smaller vessel, 12½ feet in diameter and 74 feet high, in which catalyst for the reforming process will be regenerated. Over all height of the completed unit, exclusive of the supporting pedestal, will thus exceed 200 feet.

Like the bottom head, the top head and the nine courses for the shell of the large reactor will be shipped to the job site in longitudinal halves. The smaller regenerator vessel will be fabricated in the shop, stress relieved in one of Kellogg's huge furnaces, and shipped to the job site fully assembled. Stress relieving of the welds in the reactor, in itself a job of tremendous magnitude, will be done in the field after the vessel is erected.

The reactor is being fabricated of carbon-moly steel plate, varying in thickness from 2 inches for the top head to 2¾ inches for the lower shell courses and bottom head. Chrome-moly steel plate will be used for the regenerator section.

KELLOGG
EXCHANGERS
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THIN WALL ALLOY PIPING
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COOLERS

This Simple Compressor Meets the Complex Needs of a Changing Petroleum Industry

It's the Nash!

Here is a compressor presenting advantages found in no other device. Nash Compressors have only one moving part, rotating without metallic contact with the pump casing. No internal lubrication is required. Yet they produce 75 lbs. pressure in a single stage, with capacities to 6 million cu. ft. per day in a single structure.

There are no valves, gears, pistons, sliding vanes, or other complicated wearing parts in a Nash. Compression is secured by an entirely different principle of operation. Because of this, gas pumping problems difficult with ordinary pumps are often easily handled by the Nash. For example, Nash Pumps are standard equipment in the Synthetic Rubber Industry, where they have met the needs of new and difficult processes.

Nash Compressors are compact and save space. They run without vibration, and compression is without pulsation. They maintain original performance over long periods. Service is assured by a nationwide net-work of Engineering Service offices. Instructive bulletin shows how they operate. Write for it.

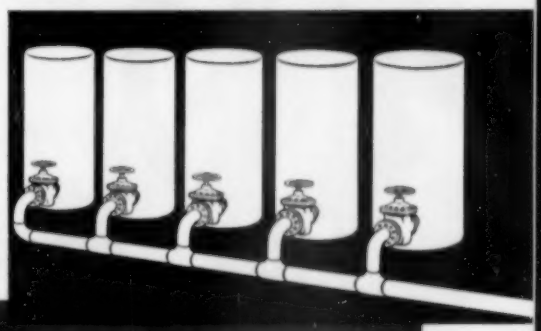
- One moving part.
- No internal wearing parts.
- No valves, pistons, or sliding vanes.
- No internal lubrication.
- Low maintenance.
- Slugs of liquid entering pump do no harm.
- Non-pulsating pressure.
- Saves floor space.
- 75 pounds in a single stage.

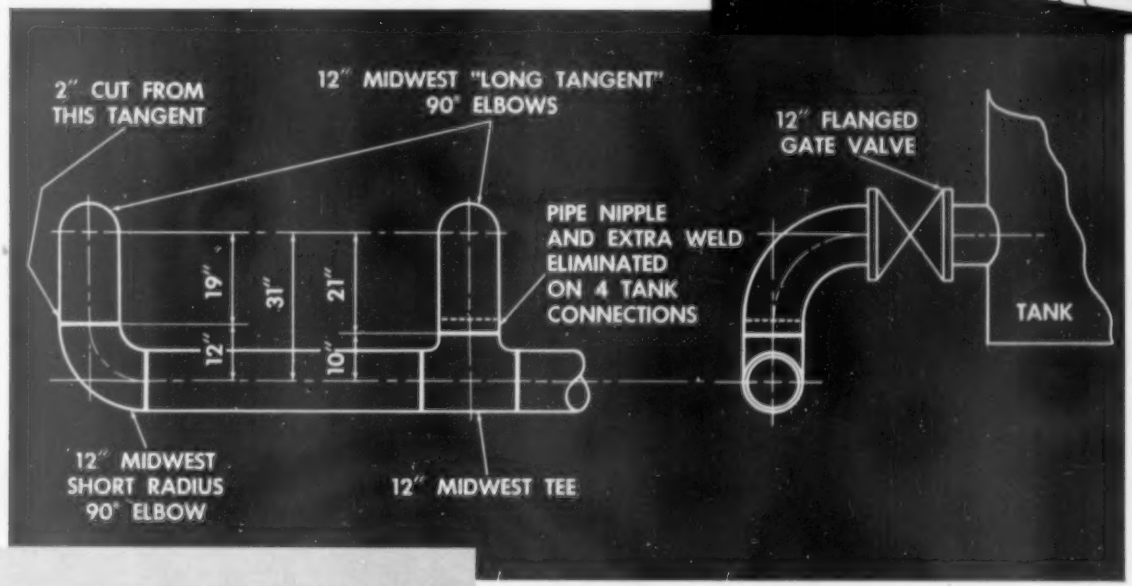
NASH ENGINEERING COMPANY
274 WILSON, SO. NORWALK, CONN.

MIDWEST "LONG TANGENT" ELBOWS

SAVED $156.20

On This Welding Piping





MIDWEST "LONG TANGENT" ELBOWS COST NO MORE THAN OTHER ELBOWS

The Problem:

To connect the five tanks shown in the sketch at top to a common 12" header.

The Difficulty:

The center-to-outlet dimension of the 4—12" tees is only 10", while the shortest elbow available measures 12" center-to-end. Thus, if standard long radius elbows are used next to the five tank valves, four short nipples and four extra 12" welds would be required.

The Solution:

By using Midwest "Long Tangent" elbows as shown in the blueprint, the expense of the four extra nipples and welds was eliminated at the cost of just one cut! The actual net savings made by "Long Tangent" elbows on this job was $156.20.

Remember—Midwest "Long Tangent" elbows cost no more than regular elbows! For further information, write for Catalog 54.

MIDWEST PIPING COMPANY, INC.

Main Office, 1450 South Second St., St. Louis 4, Missouri

PLANTS: ST. LOUIS, PASSAIC, LOS ANGELES, and BOSTON

SALES OFFICES: NEW YORK 7—50 CHURCH ST. • LOS ANGELES 33—520 ANDERSON ST.
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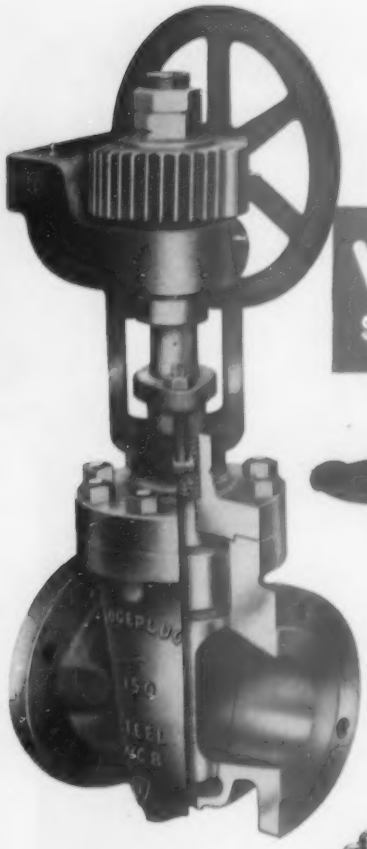
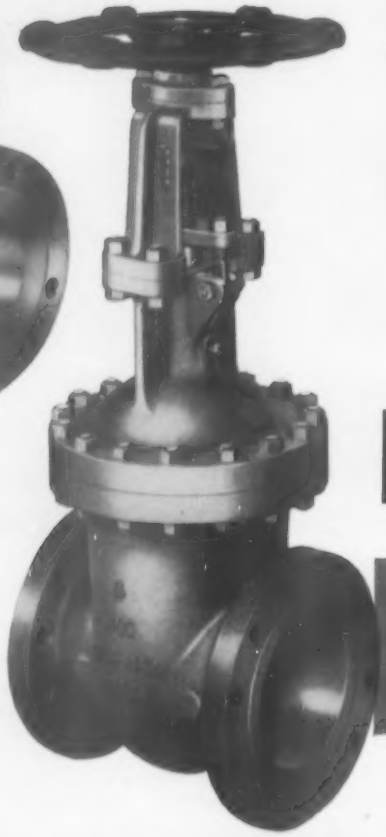
6820

MIDWEST WELDING FITTINGS IMPROVE PIPING DESIGN AND REDUCE COSTS



WEDGEPLUG
STEEL DRY PLUG VALVES



Twins in good performance

● The "know how" developed by the Stockham Organization during a half-century of manufacture assures the good performance of WEDGEPLUG and STOCKHAM VALVES.

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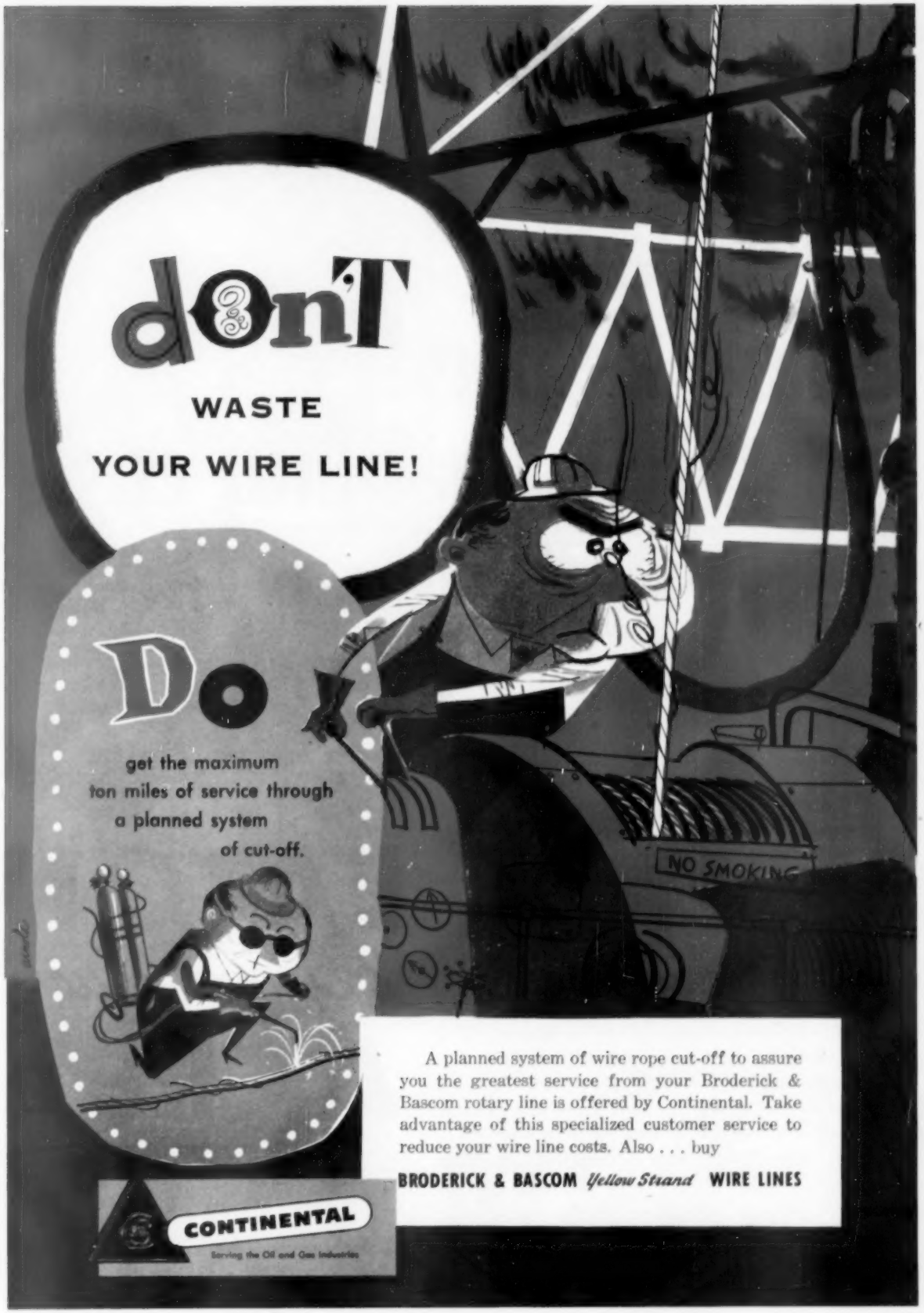
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YOUR WIRE LINE!
Do
get the maximum
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a planned system
of cut-off.
NO SMOKING
A planned system of wire rope cut-off to assure you the greatest service from your Broderick & Bascom rotary line is offered by Continental. Take advantage of this specialized customer service to reduce your wire line costs. Also . . . buy
BRODERICK & BASCOM Yellow Strand WIRE LINES
CONTINENTAL
Serving the Oil and Gas Industries

In the field or on the highway... Eaton 2-Speeds cut hauling costs

More than two million Eaton Axles in trucks today!

By doubling the conventional number of gear ratios, Eaton 2-Speed Axles permit drivers to select the best ratio for every load and road condition. Whether hauling pipe over mud and ruts in the field or high-balling tankers over distribution routes, engines run in their most efficient speed range. This means less time in the shop, more time on the job, and thousands of additional miles of vehicle life. Eaton 2-Speeds last longer, too: positive lubrication at even lowest speeds is assured by Eaton's exclusive forced-flow oiling system, and planetary gearing better distributes gear-tooth loads. Ask your dealer to tell you how these and other exclusive Eaton features can help you save time and money in either production or distribution.

EATON
2-Speed Truck
AXLES

Axle Division

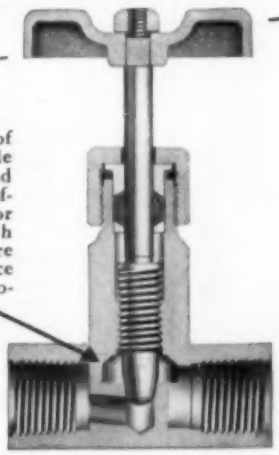
EATON MANUFACTURING COMPANY

CLEVELAND, OHIO

PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

MAXIMUM WORKING PRESSURE
10,000 PSI
for water, oil or gas

- Body and stem guide extra heavy bar stock fused into one piece.
- Valve stem 416 stainless steel.
- Packing special one-piece "Marpak" moulded ring.
- Bodies marked in accordance with MSS regulations.



ONE PIECE

The stem guides of conventional needle valves are screwed into bodies—this often causes leakage or blow-outs. Marsh Needle Valves are fused into one-piece by exclusive "Conoweld" process.

Introducing-

The Ultimate in Needle Valves

Here is one of the crowning achievements of Marsh research, design, and manufacturing skill. It is the first needle throttling and shutoff valve to combine *all* of the qualities called for today in this highly critical and ever broadening field.

It is a valve that has strength and safety to spare . . . rated for pressures up to 10,000 psi—equally efficient in the lower ranges. A product of Marsh instrument-making and valve manufacturing experience, it combines instrument-like precision with the ruggedness that distinguishes all Marsh valve specialties.

The illustrations tell the story of new thinking; new standards. Body and stem-guide are machined from extra-heavy carbon steel bar stock. Still greater strength and rigidity are achieved by fusing the stem-guide into the body. The complete fusion of guide and body is accomplished by the exclusive Marsh "Conoweld" process.

There are two big advantages to this one-piece construction: (1) It eliminates the danger of unscrewing the valve from the body when opening—a frequent cause of leakage, even dangerous blow-outs (2) It permits perfect line-up of threads and seat. As a result, Marsh valves are easier to operate even at high pressures.

The precision-machined stem is 416 stainless steel. Stem threads are fine pitch for extra strength and fine, controlled regulation. Notable advancements are special "Marpak" one-piece, non-binding longer-lasting packing; deep thread chambers, keeping inlet and outlet piping away from ports and contributing excellent flow characteristics. Entire packing nut and packing gland are electro-zinc plated, preventing corrosion and giving the valve a handsome, plated exterior. The rugged malleable handle is finished in heavy baked enamel.

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This Chart shows the proper setting for constant load engines

BRAKE H. P. AT BELT	NAT. GAS CU. FT. PER HOUR	BUTANE GALLONS PER HOUR	GASOLINE GALLONS PER HOUR	M. M. OIL DROPS PER MIN.	M. M. OIL HOURS PER QUART
10	115.	1.07	1.12	4	228
15	172.5	1.60	1.68	6	152
20	230.	2.14	2.24	8	114
25	287.5	2.67	2.80	10	91
30	345.	3.21	3.36	12	76
35	402.5	3.74	3.92	14	65
40	460.	4.28	4.48	16	57
45	517.5	4.81	5.04	18	50
50	575.	5.35	5.60	20	45
60	690.	6.42	6.72	24	38
70	805.	7.49	7.84	28	32
80	920.	8.56	8.96	32	28
90	1035.	9.63	10.08	36	25
100	1150.	10.70	11.20	40	22
120	1380.	12.84	13.44	48	19
140	1610.	14.98	15.68	56	17
160	1840.	17.12	17.92	64	14
180	2070.	19.26	20.16	72	12
200	2300.	21.40	22.40	80	11
225	2587.5	24.00	25.20	90	10
250	2875.	26.75	28.00	100	9
275	3162.5	29.42	31.10	110	8
300	3450.	32.10	33.60	120	7

EXAMPLE:—If you use 805 cu. ft. of dry gas, 7.49 gallons of butane or 7.84 gallons of gasoline, your H.P. is about 70, so adjust oiler to feed 28 drops per minute. You will then receive about 32 hours per quart of MARVEL MYSTERY OIL.

If engine load increases after setting for normal load, oiler will automatically increase its feed, or decrease its feed when load is lessened.

When more than one oiler is used

To determine drop count per oiler when more than one oiler is used on an engine—divide recommended drop count by number of oilers.

NOTE: Guarantee on oiler is void if any other oil than MARVEL MYSTERY OIL is used therein. Some *engines* also carry this guarantee policy.

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EMEROL MFG. CO. Dept. 373, 242 West 69th Street, New York 23, N. Y.

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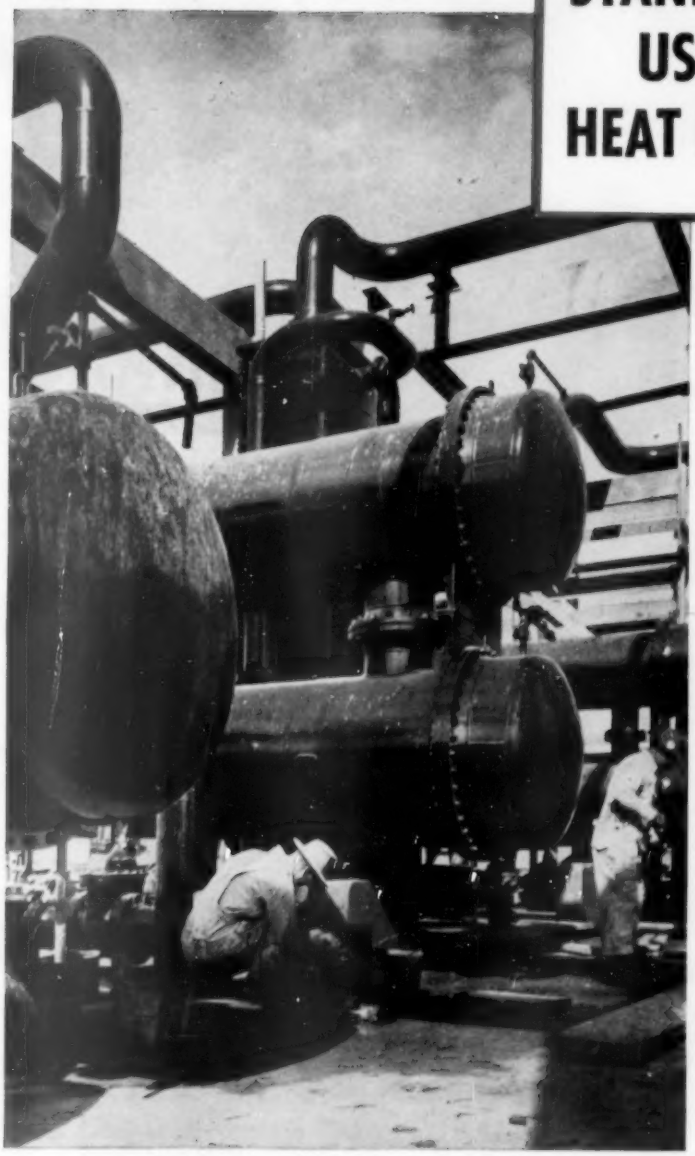

Petroleum processing is hard on Heat Exchanger Tubes. Pressure, coupled with high temperature and tough corrosive conditions, can drastically affect the life of tubing.

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Petroleum processors have benefited from the advantages of ELECTRUNITE Heat Exchanger Tubes for many years. Get these same benefits by specifying Republic ELECTRUNITE Pressure Tubes on your next order for heat exchangers or retubing. For more information, write to:

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Export Department: Chrysler Building, New York 17, N. Y.

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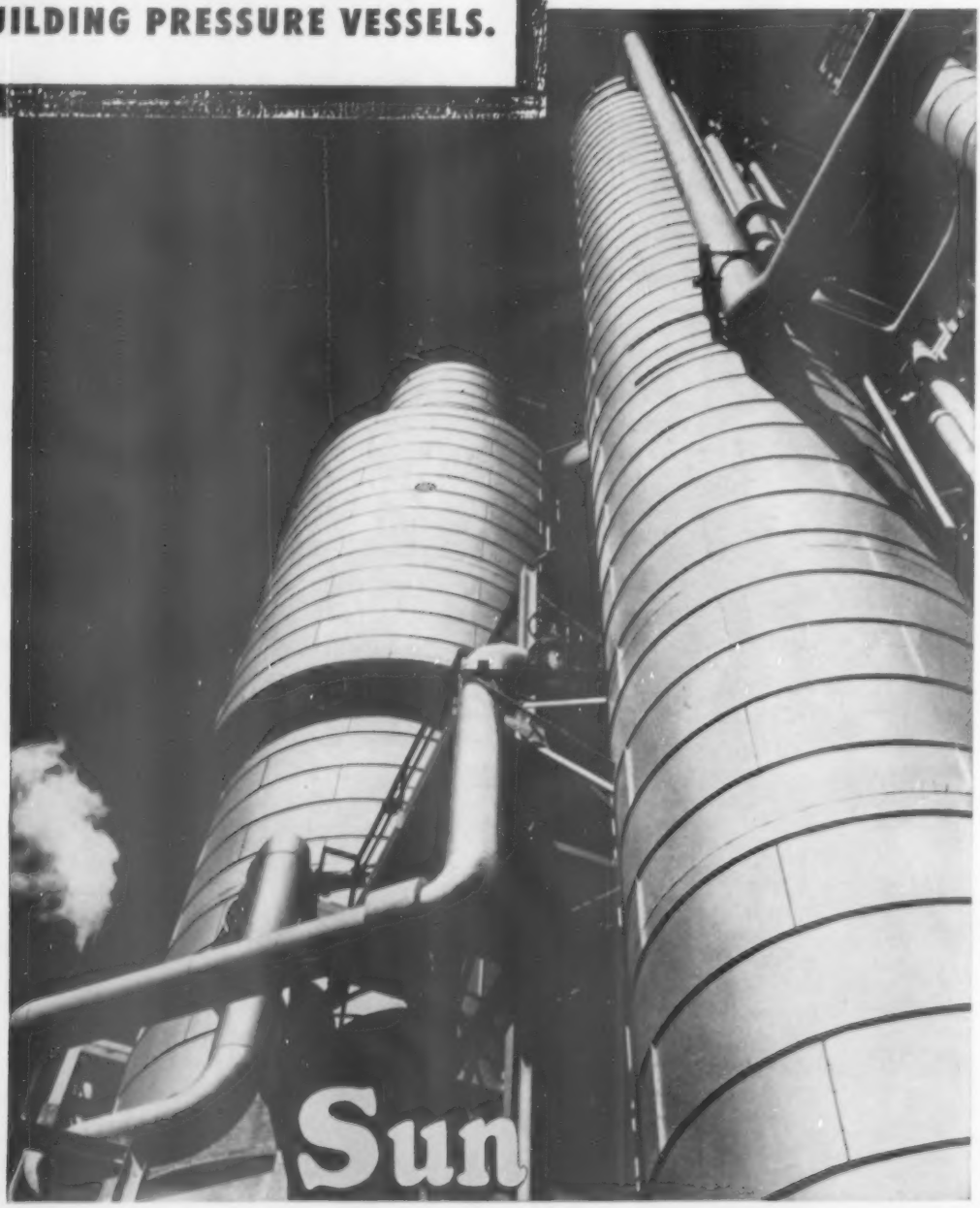

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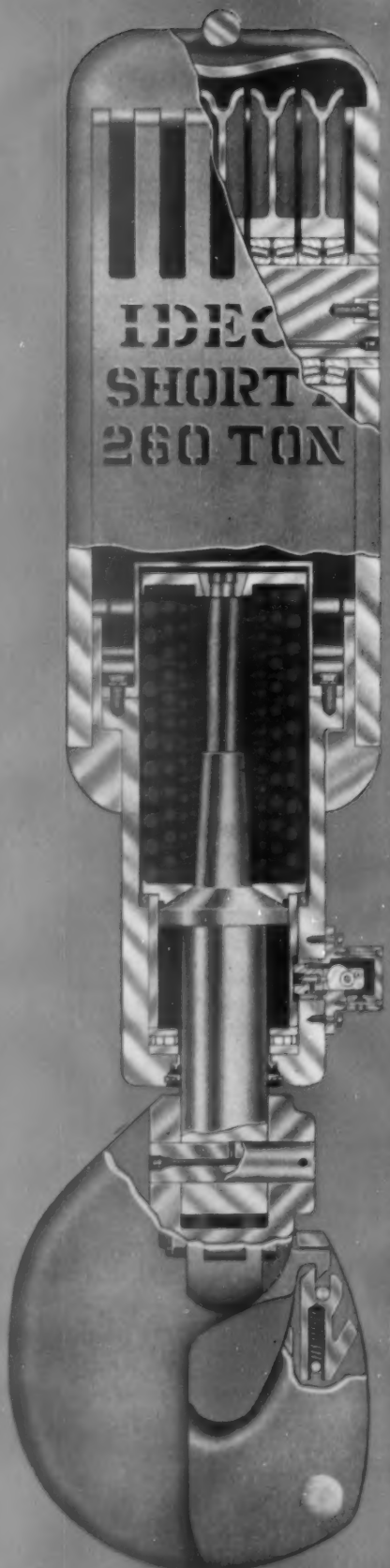

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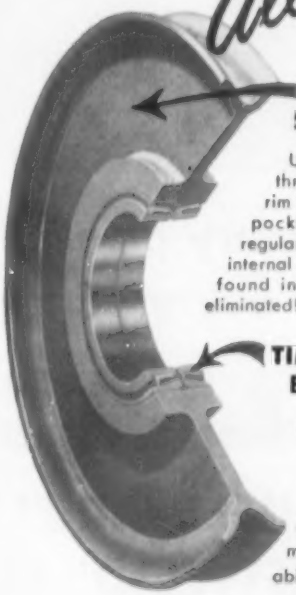

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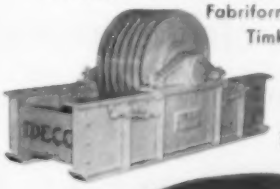

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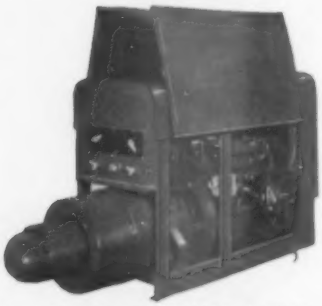

Figure 1. 200 amp "Shield-Arc" *Gasoline Engine Driven with Lincoln Dual Control. Current range 40 to 250 amperes.*

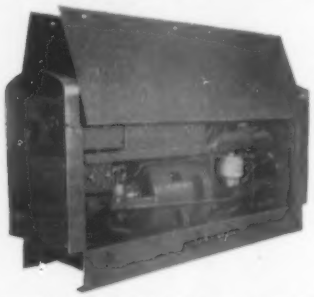

Figure 2. 300-400-600 amp "Shield-Arc" *with Lincoln Dual Continuous Control. Gasoline Engine Driven. Current ranges 60-375 amps, 80-500 amps, 120-750 amps.*

Figure 3. 300 amp "Shield-Arc" *with Lincoln Dual Continuous Control. Diesel Engine Driven. Current range 60-375 amps.*

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Murchison and Time...

... Murchison's Rebuttal

Dear Sir:

I want you to know how much I do appreciate the editorial in the May 31st issue of The Oil and Gas Journal entitled "Time, Murchison, and the Depletion Allowance."

I am enclosing a copy of a letter which I have written to Mr. Henry Luce (Editor-in-Chief, Time, Inc.).

Clint W. Murchison

My dear Mr. Luce:

I am writing this letter to you personally because I feel that the subject matter is a policy matter and should come directly to your attention.

I have had several contacts with your field writers, and all my experiences have been entirely pleasant. I have the highest regard for all those contacts. I think they are honest in their thinking, fair minded in their practices, and that all are fine writers and reporters. However, once the article gets out of their hands and into the possession of your re-write people in the New York office, sudden and severe transformations come over the story.

I am making particular reference to the article which you recently published on me. In all my interviews with all of your representatives not once was depletion mentioned as such. In fact, the article bore out that we were "wheeler dealers," to use your phrase, which I interpret to mean buying and selling. All we have done is to ride the tide of inflation and pyramid off our capital gains such as any other business man in the United States can do. Suddenly the article goes off on a diatribe on depletion, slanting the article not only on me but on the whole fraternity to the effect that we practice some special form of legalized theft.

I am well aware of the power of the press and of your right to pursue any editorial policy you may choose. But, in all fairness to the public, shouldn't you give the other side of the depletion picture? Shouldn't you point out the alternative for new oil resources? Or, failing this, shouldn't you be equally critical of other segments of the American economy that for one reason or another receive the assistance of the government, such as agriculture, or the airlines, or, for that matter, the publishers of magazines?

I say this not so much for myself—

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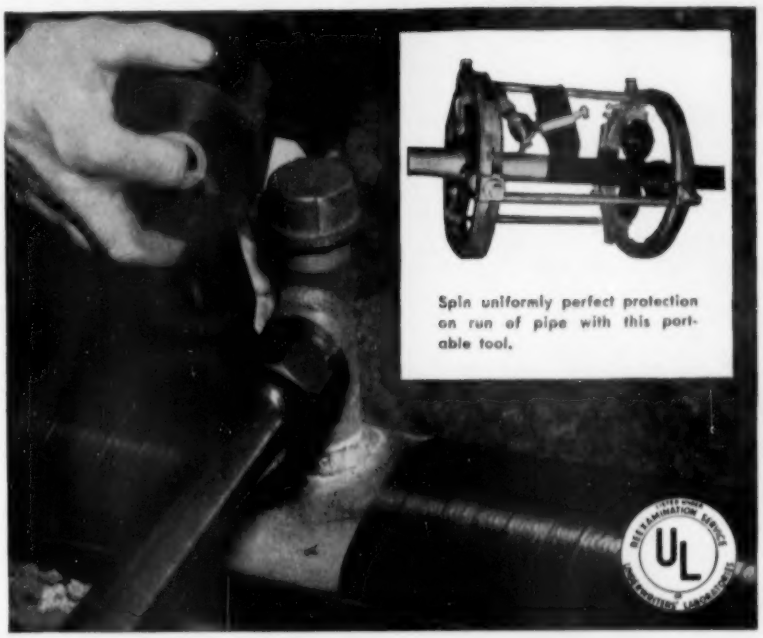

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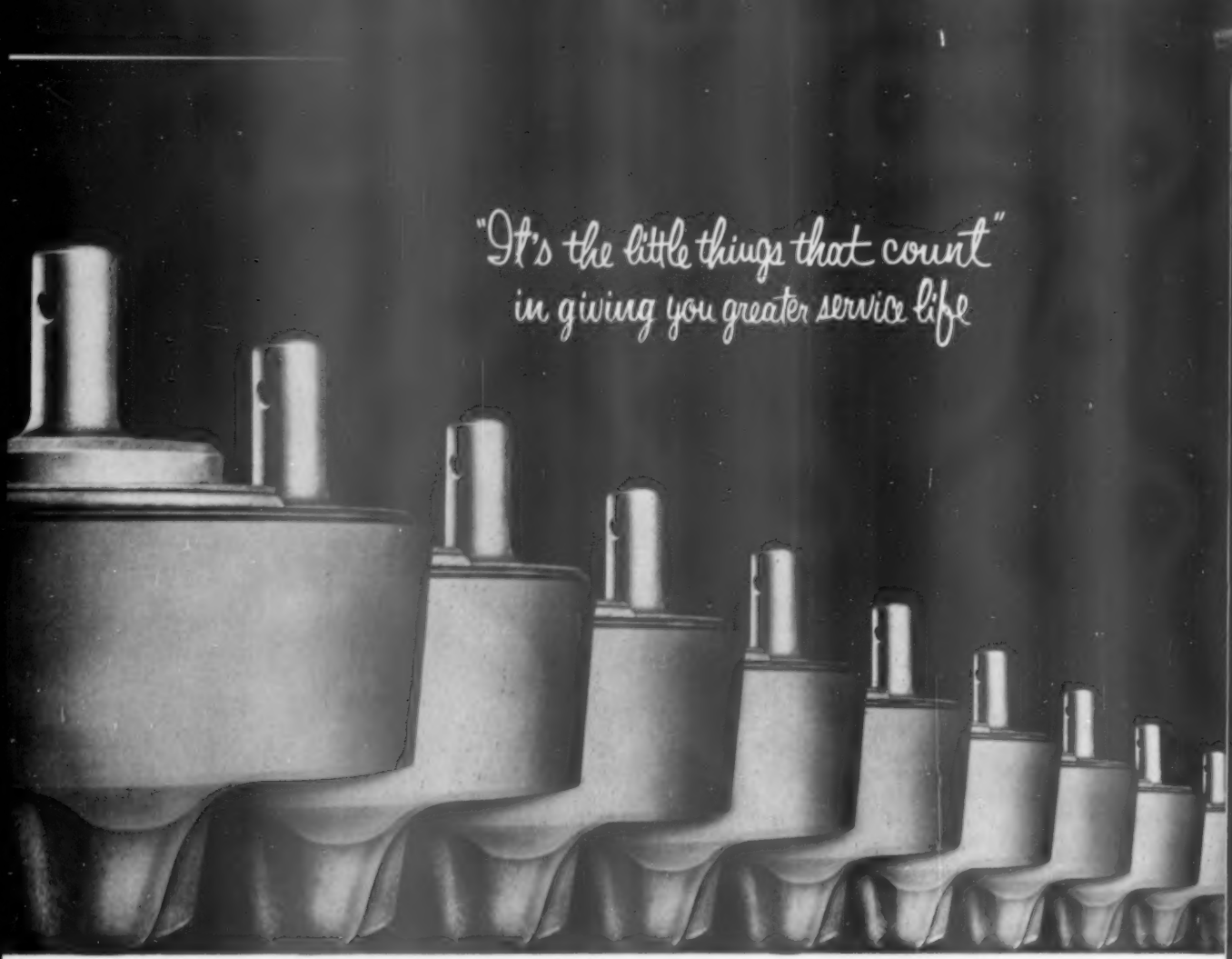

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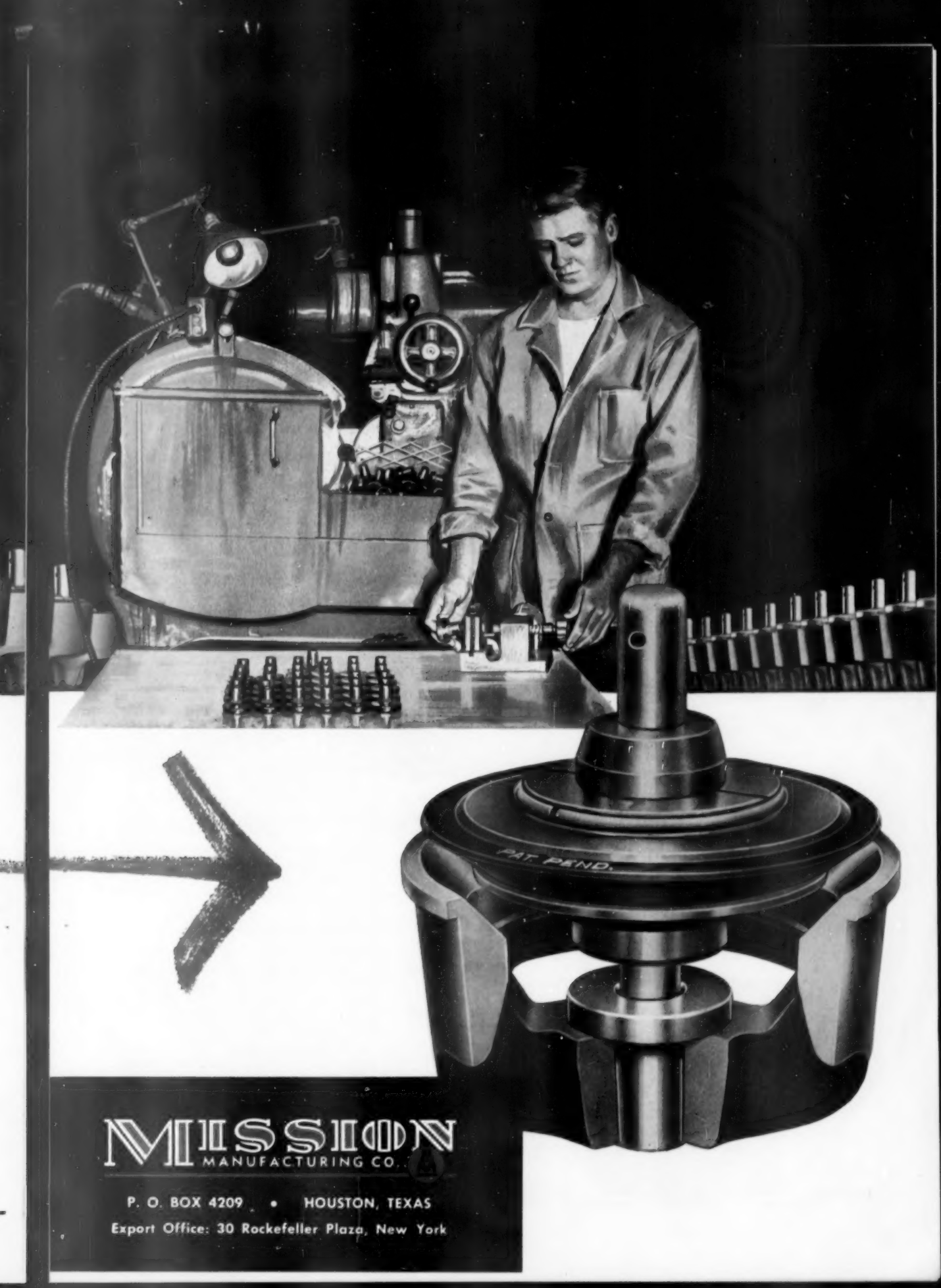

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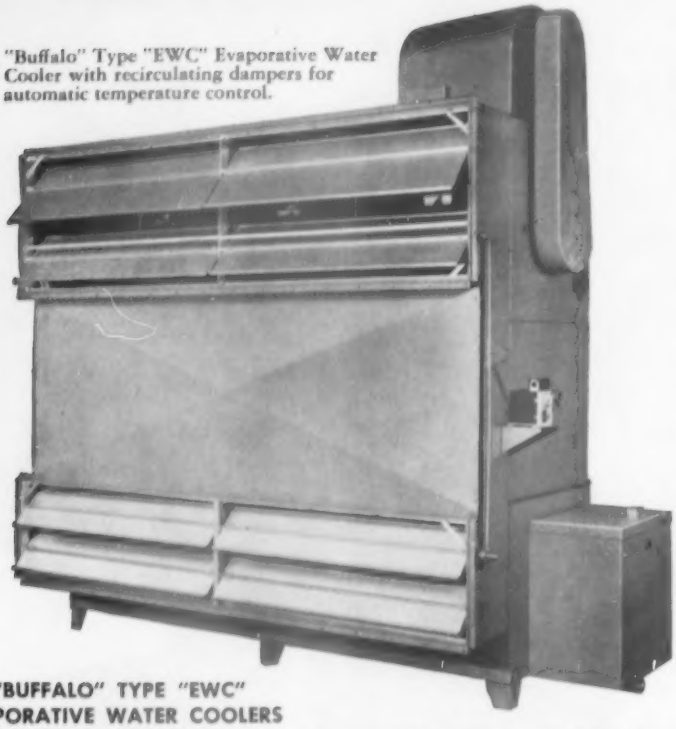

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since oil constitutes only one part of my business interests—as for the entire oil industry which is rapidly beginning to believe thtat your publications are trying to wreck it. Believe me, Mr. Luce, you have a public relations problem on your hands.

Sincerely yours,
Clint W. Murchison

. . . Another Word from Texas

DEAR SIR:

CONGRATULATIONS ON A VERY FORCEFUL EDITORIAL IN YOUR MAY THIRTY-FIRST ISSUE.

Charles E. Simons
Vice president and general manager
Texas Mid-Continent Oil & Gas Association
Dallas

. . . Time In The Business, Too

Dear Sir:

Your editorial, page 37, May 31 issue, was read with an affirmatively nodding head. I, too, read Time's recent article . . .

I was puzzled by this blast against the depletion allowance as I have been about other cracks which Time has made since Time, Inc., is in the oil business through its ownership of common stock of Houston Oil Co. According to the Wall Street Journal, New York edition of May 17, page 15, information taken from SEC filings, Time, Inc., purchased 1,100 shares of Houston Oil stock during April bringing their total holdings to 138,400 shares, which is slightly more than 10 per cent of the total shares.

I wondered if you realized that you had labeled Time's diatribe so accurately in the penultimate paragraph of your editorial where you called it "fifth-column tactics."

W. E. Long
Mountain Lakes, N. J.

. . . Undermining Industry

Dear Sir:

As always, we find many interesting articles in the May 31 issue of The Oil and Gas Journal, but most timely is your editorial "Time, Murchison, and the Depletion Allowance."

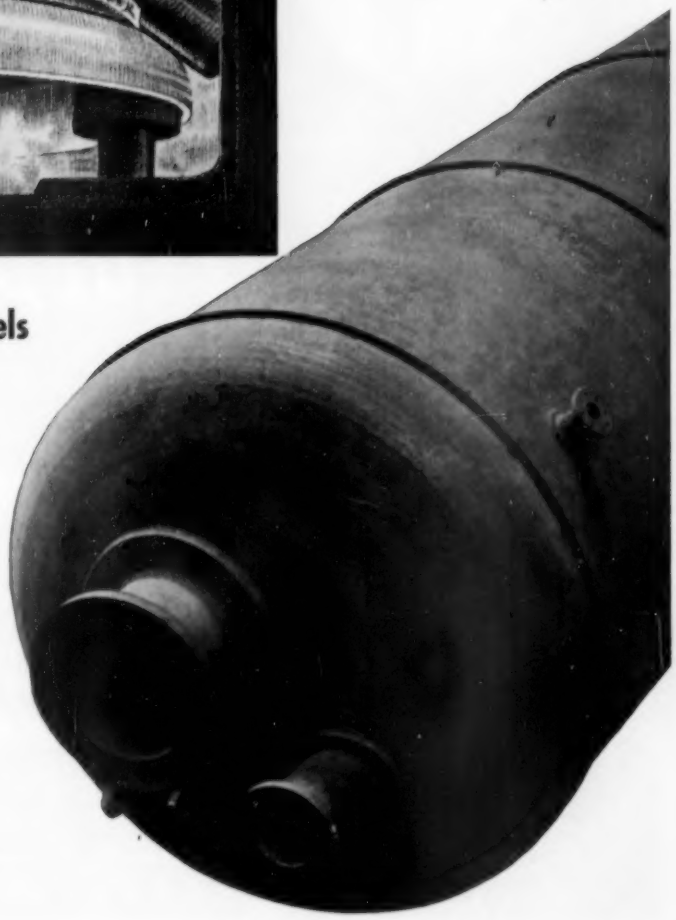
It is unfortunate that the left wing press has resorted to the undermining of the oil and gas industry to gain reader appeal and profit. On the other hand, it is just such incidents as this that makes us realize that the industry is fortunate in having a publication that can so capably point out the evils in the writing of this element of the press and politicians. It is unfortunate that your splendid editorial can not be

Spinning

SAVES METAL

—CUTS TOOL COSTS

The design and production of Pressure Vessels may be greatly facilitated by using dished and flanged ends spun by Harveys on the Rotarpress. They combine semi-ellipsoidal form with large knuckle radius. A substantial reduction in plate thickness can be effected, and in most cases tool costs are eliminated.



'Rotarprest' Ends for Pressure Vessels

can be supplied in Mild, Alloy and Clad Steels and Non-ferrous Metals. The capacity of the Rotarpress ranges from 5 to 15 feet diameter, and 3/8" to 4" thickness. Knuckle radii and depth may be varied to meet individual requirements.

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COURTESY • SERVICE • DEPENDABILITY

placed in the hands of each reader of Time so that their misinformed readers may have the opportunity of seeing both sides of the picture and fairly judge the issue of depletion allowance and other problems of the industry.

H. Don Johnson
Executive Vice President
Carl B. King Drilling Co. of Texas
Midland

. . . Good, But Not Adequate

Dear Sir:

This is to commend you for your attitude and position as exemplified by your editorial in your May 31, 1954, issue entitled "Time, Murchison, and the Depletion Allowance."

You still did not adequately express my contempt for such an article as Time magazine published; but you did about as good a job as was possible under postal regulations.

N. H. Wheless
President
Wheless Drilling Co.
Shreveport

. . . We'll Try

Dear Sir:

Congratulations to your editorial department for their page 37 of your May 31 issue. Keep up the good work.

Frederick F. Murray
President
Oil Well Supply Division
United States Steel Corp.
Dallas

. . . He's Almost Convinced

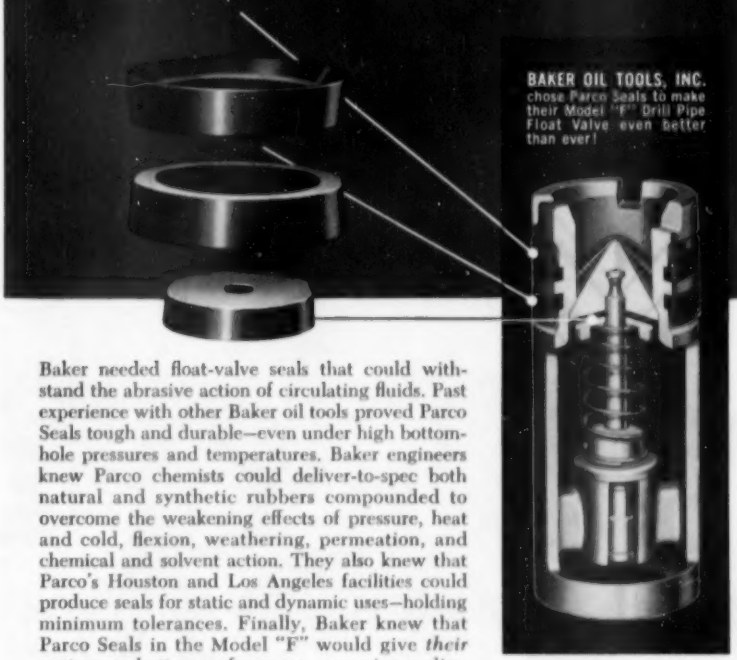
Dear Sir:

Your editorial "Time, Murchison, and the Depletion Allowance" interests me because your so-called left-wing press has about convinced me that practically anybody can get rich in the oil business and that the 27½ per cent bonus simply provides that much additional money to squander and with which to perform the most asinine antics . . .

In my opinion, the complexion of the whole splendid industry is being colored by a few individuals who associate themselves with anything or anybody that will advance their reputation for recklessness and emphasize their assumed idiosyncrasies which they think somehow glamorizes them . . .

In my opinion, the industry is extremely vulnerable and is badly in need of self-examination. Steps should be taken through the medium of its various association publications, the O.I.I.C., and the A.P.I. to promote dignity among those who feel that they must have the whole world know that they

Parco Seals give positive leak-proof sealing



Baker needed float-valve seals that could withstand the abrasive action of circulating fluids. Past experience with other Baker oil tools proved Parco Seals tough and durable—even under high bottom-hole pressures and temperatures. Baker engineers knew Parco chemists could deliver-to-spec both natural and synthetic rubbers compounded to overcome the weakening effects of pressure, heat and cold, flexion, weathering, permeation, and chemical and solvent action. They also knew that Parco's Houston and Los Angeles facilities could produce seals for static and dynamic uses—holding minimum tolerances. Finally, Baker knew that Parco Seals in the Model "F" would give *their* customers better performance, superior sealing action and trouble-free service.

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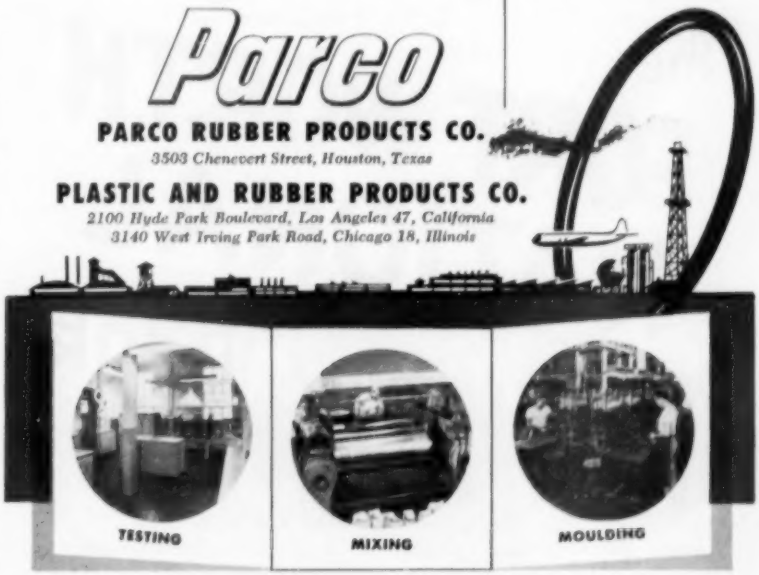
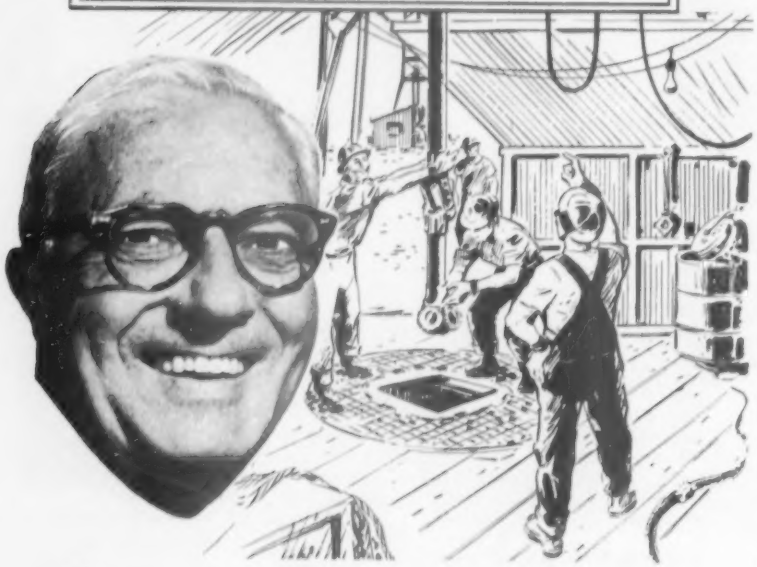


● They always talk MY language—the petroleum specialists in The Fort Worth National Bank's Oil Loan Division. And when oil loan matters arise, I've found The Fort Worth National gives service that's tops in every respect. That's why I and so many others in the oil industry are saying . . .



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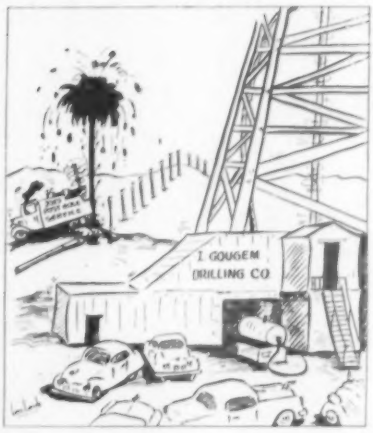
have struck-it-rich in the oil business.

R. E. Giddens
Tulsa



(The above cartoon appeared in the May issue of Shell Oil Co.'s Rocky Mountain Echo. Ken Lamb, of Shell's Casper division, was the cartoonist.)

More on Phillips Case...

. . . Greedy for Power

". . . This dictum makes an interesting doctrine. If it were applied with any consistency it could put a lot of other industries under control of the federal price fixer through the guise of utility regulation.

"Many gas utilities, for example, manufacture their own gas from coal rather than buying it from wells. . .

". . . It is immediately arguable that the coal industry ought to be under federal regulation at least to the extent of having the Government fix the price it can sell to an interstate gas company.

"For that matter, why should the electric utilities be left out? Many of these make their electricity from coal-fired generators and the price of coal certainly has a 'substantial effect' on the cost of the electricity. . .

". . . It certainly seems to present the Government with vast new powers of control. And as President Eisenhower remarked the other day, when it comes to the use of power all governments are greedy."

Editorial in the Wall Street Journal.

. . . Get Legislation Started

". . . If it now wants to right a situation which threatens near-chaos and great economic damage, as well as harm to the interests of gas consumers dependent upon supplies from the producings states, Congress will have to pass new legislation saying just where the limits of federal regulation lie, and saying it so plainly that it can not be

misunderstood. Congress and Congress alone can do it, and there should be no delay in getting started."

Editorial in the Fort Worth Star-Telegram.

. . . Can't Recover Losses

". . . To the smaller producers it threatens nothing less than utter ruin. Under the so-called 'Olds formula,' the power commission could allow the operator who had gotten one or two producing wells after many expensive failures to sell his gas at prices giving him 5½ to 6 per cent profit on the depreciated cost of his successful ventures only. He would have no way to recover his losses and would be forced out of business."

Editorial in the Houston Post.

. . . Based on Insecure Knowledge

". . . The court's decision seems to point toward the following effects: (1) Further invades States' rights, (2) further overrides the will and usurps the prerogative of Congress, (3) calls for a larger federal bureaucracy, (4) opens the way to a wide field of new litigation to settle new questions, (5) adds to the cost of production and transportation, and (6) discourages future exploration and production.

"The decision is another expression of the court which seems to lean farther and farther toward political ideology while getting deeper and deeper into economic and political problems of which its members have insecure knowledge."

Editorial in the Dallas Morning News.

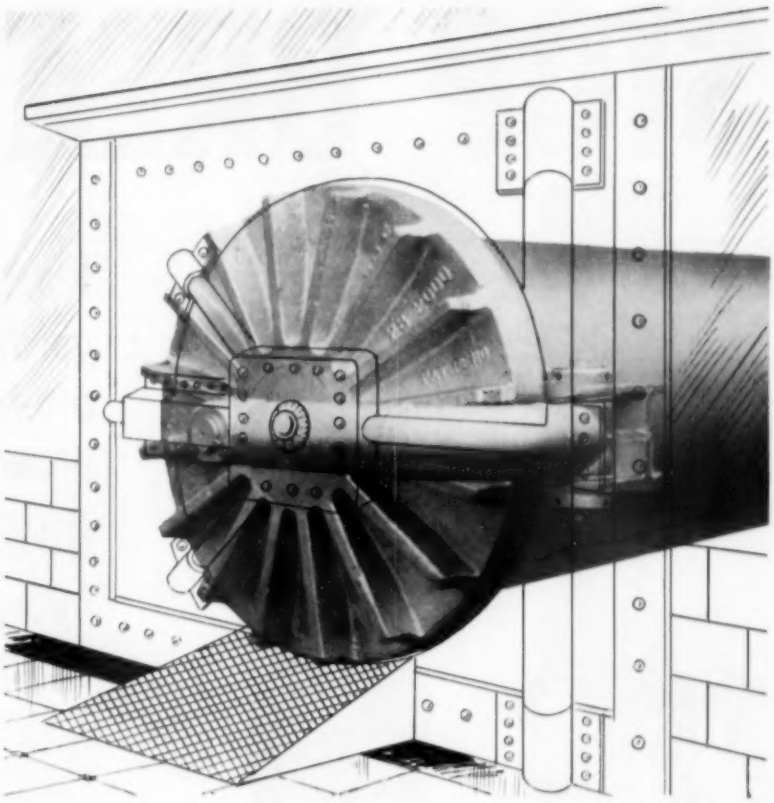
Why Penn Grade Is Superior

"Recent reduction in the price of Pennsylvania Grade crude oil has led to speculation by some writers, and outright assertion by others, that this quality oil has lost its premium position in the nation's market.

"Through the years Pennsylvania oil has been recognized as a superior oil because of its better lubricating qualities. Oil found in the Pennsylvania Grade region is endowed by nature with certain inherent characteristics which do not exist in anywhere near the same quality or quantity in oils found in any other known producing area.

"It is a flimsy argument and a far stretch of the imagination to intimate that a mere cut in crude oil prices is indicative of a loss of premium position of Pennsylvania Grade crude oil. . .

"The basic superiority of Pennsylvania Grade oil is as unyielding as time itself. And it is not too much to suppose that once the region's inventory situation is rectified, this basic su-



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● The cap of a YALE 2-Piece Blank Cap Union offers your lines the same sort of security as that provided for your savings by the door of the bank vault. And because of its simplified design, that YALE cap swings to and locks just about as easily as the door.

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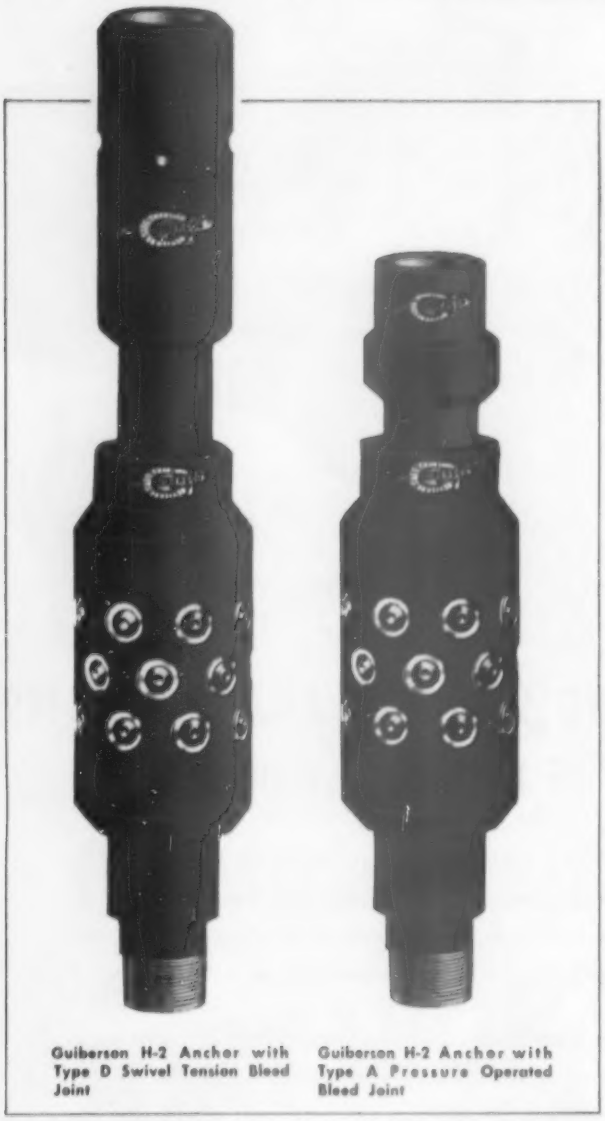

Guiberson H-2 Anchor with Type D Swivel Tension Bleed Joint

Guiberson H-2 Anchor with Type A Pressure Operated Bleed Joint

Watch lift costs go down... production go up with GUIBERSON'S H-2 *hydraulic anchor for pumping wells*

This anchor stops rod wear because it *stops breathing* — holds positively against all forces tending to cause movement of the string. Pump operation is more efficient — production is increased — lift costs are lowered.

Automatic action — no manipulation of tubing string is necessary with the H-2. As soon as fluid level in tubing is higher than casing fluid level, a series of *individual piston slips*, operating hydraulically and independently of each other, put a positive grip on the casing. Right from the start you save with the H-2 anchor. You save on first cost because the H-2 is exceptionally low cost. You save on crew time and money because the H-2 is reliable in operation — easy to set and release. You save wear and tear on your string — start lifting more fluid at lower cost.

TYPE D SWIVEL TENSION BLEED JOINT—Available in 2" or 2-½" tubing sizes. Either size shears with approximately 20,000 pounds tension at the joint. Ports in joint open when ring shears, allowing tubing to drain and thus release anchor.

TYPE A PRESSURE OPERATED BLEED JOINT — Available in 2" or 2-½" tubing sizes. Blow plug is available in 1,000 p.s.i. increments from 3,000 p.s.i. to 6,000 p.s.i. Plug ruptures when pressure differential reaches plug rating. Joints should be ordered rated approximately 1,000 p.s.i. above expected operating pressures.

Guiberson's H-2 anchor may be released by normal methods of equalizing tubing and casing pressures or with either of the above two bleed joints.

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Sold By Leading Oil Field Supply Stores Everywhere

periority will assert itself to a greater degree than ever before in today's highly competitive market. You can't relegate quality to a back seat."

Editorial in the Oil City Derrick.

No Robot Drillers

"In selecting a contractor, there are two very important factors to consider: the kind of rig and materials used, and what kind of crew does the contractor have. It is really a toss-up as to which of these two requisites is the more important. And in order to maintain a good, effective crew, it is necessary that they be protected by an effective safety educational program.

"The days of the robot driller—the electrical man that is able to take over this drilling business from a remote control—is not apparent in the near future. So this drilling business will continue, subject to human element, for years to come. And the most definite way to keep them intact is through safety measures."

W. B. Duncan, Houston Oil Co., in a paper presented at a meeting in Dallas of the American Association of Oilwell Drilling Contractors.

CALENDAR OF EVENTS

JULY

13-14 Western Plant Maintenance Conference, Ambassador Hotel, Los Angeles.
15 Southern Gas Association, conference on radio communications for pipelines, Adolphus Hotel, Dallas.
16 Southern Gas Association, dispatchers' conference, Adolphus Hotel, Dallas.
29-31 Wyoming Geological Association, ninth annual field conference, Casper, Wyo.

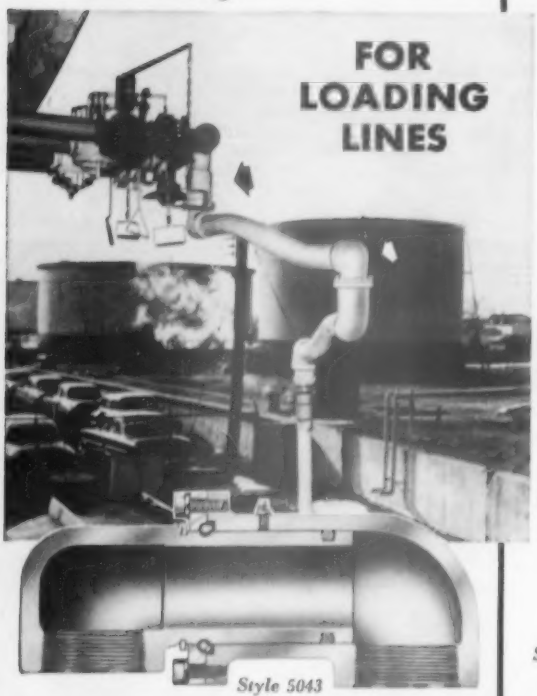
AUGUST

13 Southern Gas Association, pipeline operations and engineering conference, Rice Hotel, Houston.
16-18 Society of Automotive Engineers, West Coast annual meeting, Statler Hotel, Los Angeles.
20 Southern Gas Association, conferences on natural-gas gathering and natural-gas processing, Captain Shreve Hotel, Shreveport.
23-25 Appalachian Gas Measurement Short Course, West Virginia University, Morgantown, W. Va.
26-28 (tentative) Intermountain Association of Petroleum Geologists, fifth annual field conference, beginning at Price, Utah.
27-28 Joint meeting, reserves committees of A.G.A., A.P.I., Canadian Petroleum Association, Banff, Canada.

SEPTEMBER

7-9 Association of Desk and Derrick Clubs of North America, annual convention, Banff Springs Hotel, Banff, Alta.
8-10 Pacific Coast Gas Association, sixty-first annual meeting, Vancouver Hotel. Vancouver, B. C.
9-11 Interstate Oil Compact Commission. Omaha, Neb.
10 Southern Gas Association, conference on compressor-station operation, Jung Hotel, New Orleans.
12-16 American Institute of Chemical Engineers, Colorado Hotel, Glenwood Springs, Colo.
13-14 Independent Natural Gas Association of America, annual meeting, Roosevelt Hotel, New Orleans.
15-17 National Petroleum Association, fifty-second annual meeting, Traymore Hotel, Atlantic City, N. J.
16-17 Mid-Continent Oil and Gas Association, Louisiana-Arkansas division, annual meeting, Roosevelt Hotel, New Orleans.
23-24 Western Petroleum Refiners Association, regional meeting, Henning Hotel, Casper, Wyo.
27-28 Symposium on Methods for Testing Liquefied Petroleum Gases (ASTM D-2; ASTM D-3, CNGA & NGAA), Statler Hotel, St. Louis.
27-29 Electrical Conference for Petroleum Industry, American Institute of Electrical Engineers, Mayo Hotel, Tulsa.
27-30 Ninth Annual Petroleum Mechanical Engineering Conference, petroleum division of the American Society of Mechanical Engineers, Statler Hotel, Los Angeles.
28-29 Texas Mid-Continent Oil and Gas Association, Baker Hotel, Dallas, Tex.
30 Southern Gas Assoication, conference on transmission management, Shamrock Hotel, Houston.

BARCO Swing Joints



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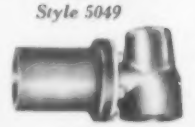
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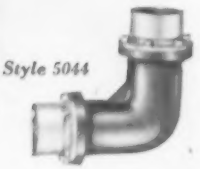
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BALL BEARING AND O-RING EQUIPPED—In Barco Swing Joints, the ball bearings do not fall out when joints are taken apart! Long bearing provides adequate pipe support. *Special O-ring seal eliminates frequent gasket replacement.* Seals on pressure or vacuum. Leakproof service over wide temperature range, −40°F. to 225°F.

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EASY MAINTENANCE—Joints can be disassembled for inspection without disconnecting piping. O-rings are easily renewable in the field. Frequent greasing not required to maintain sealing.

MANY STYLES—The Barco line is complete with single swing, double swing, and counter-balance styles to meet every need. Sizes 2", 2½", 3", 4".

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For complete information on Barco Swing Joints, ask for a copy of Catalog 400.

OCTOBER

1 Southern Gas Association, conference on gas pipeline rights-of-way, Rice Hotel, Houston.
3-7 ASTM Committee D-2 on Petroleum Products and Lubricants, Sheraton Park Hotel, Washington, D. C.
4-6 Texas Mid-Continent Oil and Gas Association, annual meeting, Plaza Hotel, San Antonio, Tex.
4-6 Petroleum Electric Power Association, twenty-sixth anniversary meeting, Jung Hotel, New Orleans.
6-8 Eighteenth Technical Conference on Petroleum Production, Pennsylvania State University, State College, Pa.
7-8 California Natural Gasoline Association, twenty-ninth annual fall meeting, Ambassador Hotel, Los Angeles.
7-8 American Institute of Mining and Mettallurgical Engineers, Pacific Petroleum chapter, fall meeting, Biltmore Hotel, Los Angeles.
10-13 American Association of Oilwell Drilling Contractors, fourteenth annual meeting, Biltmore Hotel, Los Angeles.
11-13 American Gas Association, annual convention, Atlantic City, N. J.
12-15 Eighth National Chemical Exposition, Chicago Coliseum, Chicago.
14-17 Permian Basin Oil Show, Odessa, Tex.
17-20 American Institute of Mining and Metallurgical Engineers, petroleum division, fall meeting, Plaza Hotel, San Antonio.
21-22 Western Petroleum Refiners Association, regional meeting, Garrett Hotel, El Dorado, Ark.
24-26 Independent Petroleum Association of America, annual membership meeting, Mayo Hotel, Tulsa.
25-27 National Lubricating Grease Institute, annual meeting, Mark Hopkins Hotel, San Francisco.
26-28 Society of Automotive Engineers, national diesel engine meeting, Statler Hotel, Cleveland.

NOVEMBER

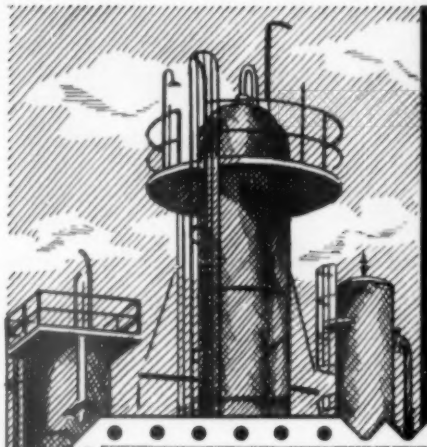
1-3 Geological Society of America, annual meeting, Statler Hotel, Los Angeles.
3-5 Gulf Coast Association of Geological Societies, fourth annual meeting, Rice Hotel, Houston.
4-5 Society of Automotive Engineers, national fuels and lubricants meeting, Mayo Hotel, Tulsa.
5 Southern Gas Association, conference on field production of natural gas, Herring Hotel, Amarillo.
8-11 American Petroleum Institute, thirty-fourth annual meeting, Conrad Hilton Hotel and Palmer House, Chicago.
11-12 American Association of Petroleum Geologists, Pacific section annual meeting, Biltmore Hotel, Los Angeles.
17-18 North Texas Section, American Institute of Mining and Metallurgical Engineers, and Production Committee of the North Texas Oil and Gas Association, symposium on secondary recovery, Wichita Falls, Tex.

28-Dec.

3 American Society of Mechanical Engineers, Statler Hotel, New York.

DECEMBER

2-4 Interstate Oil Compact Commission, winter meeting, Drake Hotel, Chicago.
2-4 American Chemical Society, Southwest Regional meeting, Fort Worth, Tex.
12-15 American Institute of Chemical Engineers, annual meeting, Statler Hotel, New York.



INCREASE throughput capacity
ELIMINATE costly liquid loss
IMPROVE overhead product quality
REDUCE harmful air pollution
with

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CASE STUDY No. 1004

VACUUM TOWER CAPACITY INCREASED 35% WITH YORKMESH DEMISTER

OBJECTIVE:

To increase feed rates from 20,000 bbl. per day to 26,000 bbl. per day without affecting gas-oil overhead quality.

PROBLEM:

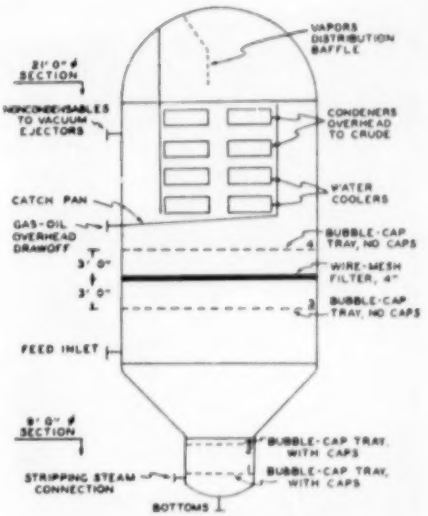
Entrainment of asphalt in the gas-oil vapors, at the high vapor velocities which were required, had made it impossible to produce a gas-oil overhead suitable for cracking feed stock.

SOLUTION:

Two wiremesh demister pads, each 2" thick and fabricated from type 304 stainless steel, placed at right angles to each other and wired together for a total thickness of 4", were installed in place of one of the original bubble trays.

RESULTS:

The use of these wiremesh demister pads increased the feed capacity 35%, and not only maintained, but actually improved the gas-oil quality.



Note: To get the facts behind this 35% tower capacity increase write for Case Study No. 1004.

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OTTO H. YORK CO., INC.

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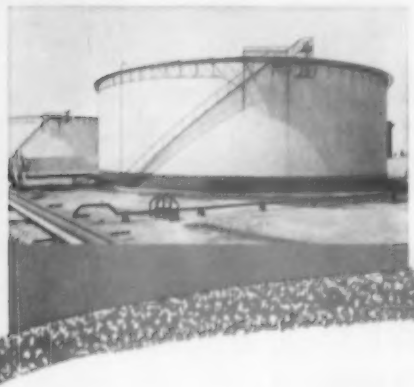
the important factors in **floating roof design**

number **6** of a series



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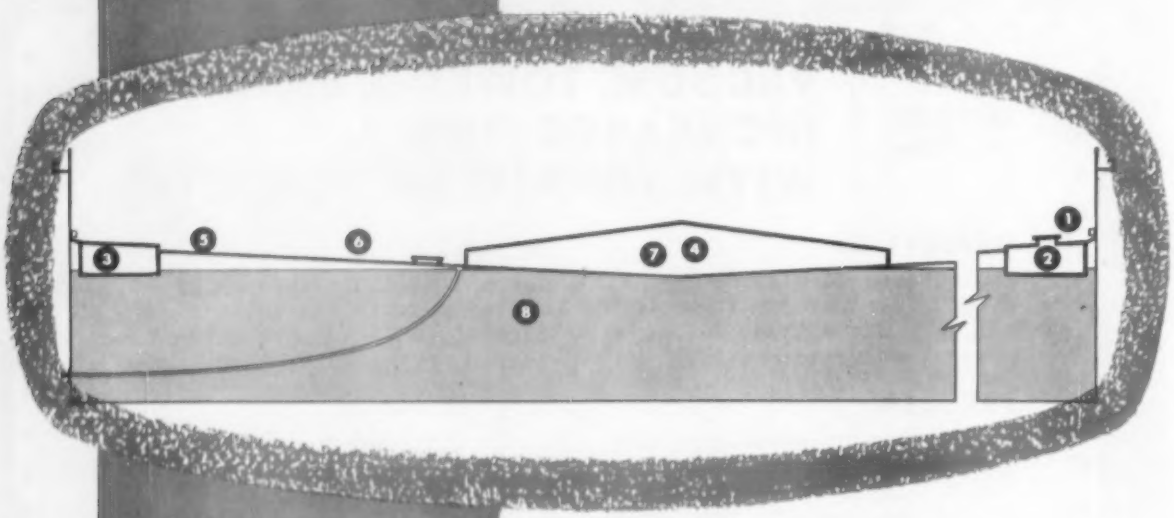
Wiggins Floating Roof Specifications

fact by fact with any other floating roof and you'll find that only the Wiggins meets every important design specification.



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8. Assure full use of the capacity of the tank for in and out storage.

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THE OIL AND GAS

JOURNAL

TULSA, OKLAHOMA

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JOURNALLY Speaking

Effete Alibi

WE didn't have any comeback when several readers chided, kidded, ridiculed, and poked fun at us for misspelling "exorbitant" in this space March 29. But now a reader catches a blooper in our June 14 issue and at the same time provides us with an alibi.

"As you were saying," he writes, " 'Readers always delight in pointing out a mistake by an author . . .'

"In the Spindletop item I notice near the bottom of Column 1:

" 'Furthermore, "spindletop" seems too effete a term to have been coined by early-day oil men . . .'

"Now, what puzzles me is how the term could be *coined* if it were *effete*, which my dictionary defines as 'that which has lost its vigor or energy; exhausted; worn out'."

That explains everything. We should have used a word giving the connotation of cultured, polished, or even effeminate, but we were just too effete to drag ourself to the dictionary.

Not so Smot

MISUSE of a word wasn't the worst error in that Spindletop item. Apparently we rerouted a couple of rivers. At least that seems to be the meaning of the following communication which we reprint in full just as received:

"Dere Couzan l'Editur,

"I read on you beeg yellow paper wich have date of June 14, about M'sieu 'Journally Speak,' who say dose pipples ride on Sabine River an look at dat Spindletop pine tree wich tell 'em how not bump de bank an' dat how Spindletop get hees nem. Well, mebbe dose Hahvahd pipples is not so smot but dey not only ones lak dat.

"Me, I tink dose wuz Cooneys who paddle dey pirogue on Neches River. If M'sieu Ralph or hees fran Golden Annie look at map dey see you got to make pass on high Neches River bridge and drive long way to Sabine River wich Cooneys got to cross to get to ol' contree. Me, I don' b'lieve you could see dose tree from Sabine River even wit a beeg spy glass.

"Respt."

Well, we'll admit that we can make just as big mistakes as "dose Hahvahd pipples." But still nobody has come forward with a completely acceptable explanation of how Spindletop got its name.

Accent Pem

OUR Frank Gardner, exploration editor extraordinary and geological reporter plenipotentiary, has just returned from Canada where he took a look at that exciting new field which is described by its boosters as "the biggest field on the continent" and by its detractors as "the Canadian Spraberry."

Because of the mud and muskeg, Frank had to do most of his reconnaissance by helicopter, but he collected dope and documents to the amount of 12 lb. of excess air baggage and is now engaged in pounding out a series of articles for our favorite oil publication. You can read his estimate of this field in the next few issues, but so far as we are concerned he cleared up the biggest mystery about it when he reported that the name is not pronounced Pem-BEAN-a nor Pem-BY-na, but PEMbinuh. It was worth a trip to Canada to get that point settled.

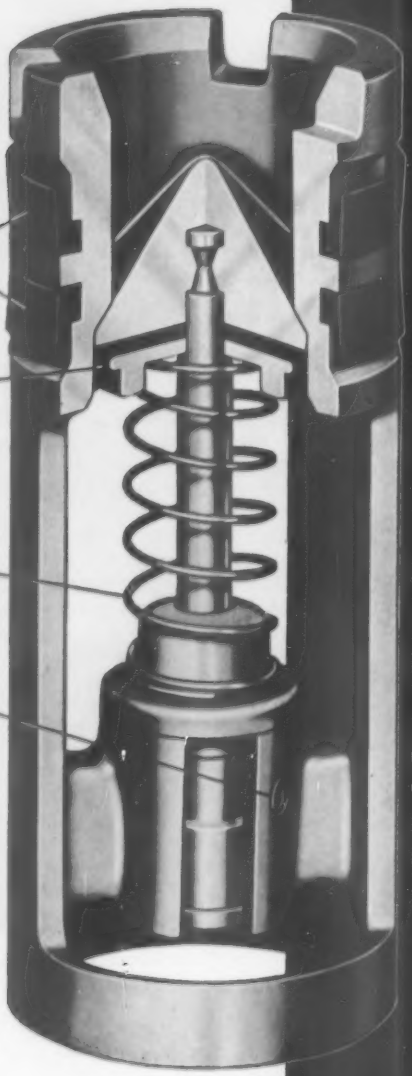
Cuban Attraction

JUDGING from the reports of the number of oil men flocking to Cuba to take a look at the oil strike there, we should soon have a revival of that old song "I'll see you in C-U-B-A." That was a Prohibition-era song, and what attracted Americans to the Pearl of the Antilles then was a liquid other than oil. But if there is any truth to some of the lowdown we hear about that Cuban well it will be quite some time before oil supplants bottled cane juice as Cuba's principal liquid export.

—Henry D. Ralph

Now... better than ever...

Baker Drill Pipe Float Valve



SIDE SEALS REVERSED

to prevent distortion of seals by trapped fluid. Valve is easily removed.

MORE EFFECTIVE SEAL

The redesigned seal between the valve and the valve seat seals better—lasts longer—*stays in place* even under high circulating volumes and high pressures.

LESS SPRING TENSION

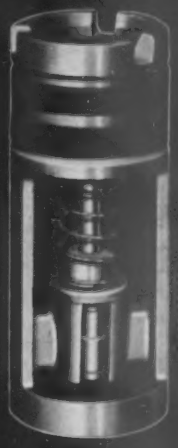
Reduces the cutting action of circulating fluid on the valve seal and seat.

GUIDE POSITIVELY ANCHORED

The valve guide is securely held in place by the set screw.

New!

BAKER MODEL "F" DRILL PIPE FLOAT VALVE



Baker Model "F" Drill Pipe Float Valve, Product No. 4813

Suggestions of drilling contractor and drilling department personnel have helped in redesigning and improving Baker Drill Pipe Floats so that they are *now better than ever*. They will save *you* time and money, muss and fuss, in every string.

POSITIONED WHERE DESIRED—A majority of operators install the Baker Drill Pipe Float Valve in a recess in the lower end of the drill collar where it is held in position by the pin on the drilling bit. Or the Valve can be positioned in a Drill Pipe Float BODY which serves as a tool joint sub at any point in the string.

EASILY INSTALLED AND SERVICED—The strong, simple Valve is made without threads and is merely dropped into place—or just as easily removed—by hand. No tools or wrenches are required. The inexpensive wearing parts are available at your supply store, and servicing is quickly and easily done right on the derrick floor.

The Baker Drill Pipe Float does so much; saves so much; and costs so little that we suggest you . . .

PICK ONE UP AT YOUR SUPPLY STORE—TODAY

BAKER

OIL TOOLS, INC.

HOUSTON · LOS ANGELES · NEW YORK

A tough summer could bring a brighter fall

THINGS are darkest, they say, just before the dawn. It looks now as though the oil industry faces a pretty tough summer—too much oil, too little consumption, and all the troubles and dangers that go with such a combination.

Pessimism is rife in many segments of the industry. The statistics on supply, demand, and stocks aren't encouraging, but the feeling in the industry is even worse. Producers are openly worried that the crude price structure may break before very long.

It could, too, if things go on the way they have been. Oil producers and regulatory authorities cannot and should not take concerted action to restrict supplies in order to boost prices. But the law of supply and demand is still functioning, and the antitrust laws don't prevent anyone in the industry from looking around him and noting danger signs.

THERE ARE MANY DANGER SIGNS visible today. Demand has been below expectations all year, and the motoring season so far has brought a disappointingly small increase in consumption.

In the Rocky Mountains, there are persistent reports of crude moving at prices below the normal gravity scale. On the Gulf Coast, big lots of crude are being offered but finding no takers. In the Mid-Continent, some purchasers are trying to get rid of many of their lease connections.

Refiners are getting very choosy about the types of crude they will take, and are notifying pipelines that they will not renew contracts for less-desirable crudes. Crude-oil buyers have become peddlers, spending most of their time hunting ways to get rid of what they are committed to take. Market prices for refined products are weak all across the board. The average refinery realization on a barrel of crude is dropping, meaning that those who buy crude have less money to spend for it.

BUT THERE IS A BRIGHT SIDE. It appears that most elements in the industry are now admitting that supplies can't continue to pile up heedlessly without causing trouble all around. And some people are doing something about it.

Texas has ordered a substantial cut in production during July. Louisiana will cut a little. Oklahoma is making a valiant effort to curtail. Several big importers have announced downward revisions of their foreign lifting schedules.

The long-range outlook is for a healthy growth for the entire industry for many years. Unquestionably the fall and winter will bring a brisk pickup in demand. If a few more people in position to influence supply will take corrective measures now, the industry can squeeze through the summer without anything drastic happening and can have its house in order within a few months.

Ideal for mildly corrosive service

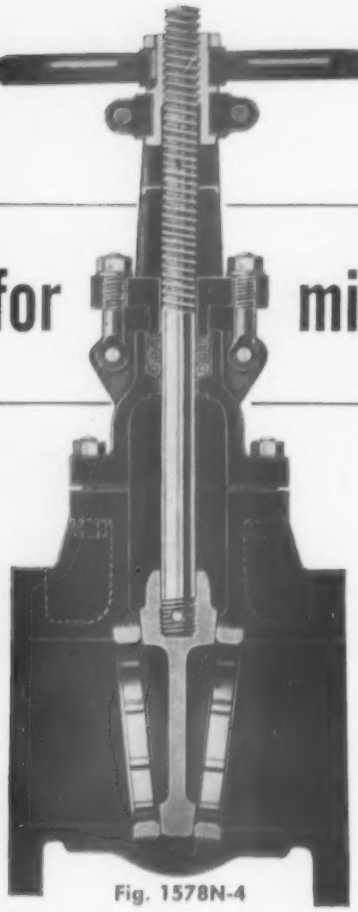


Fig. 1578N-4

3% Nickel Iron Gate Valve, Class 125 lb. . . . for process industries . . . developed and produced by The Lunkenheimer Co., Cincinnati 14, Ohio. Outside screw and yoke, bolted bonnet, flanged . . . face to face dimensions are American Standard for 125 lb. Cast Iron Wedge Gate Valves (ASA B16.10-1939).

LUNKENHEIMER develops new 125 lb. nickel-iron valve for process industries...

Mildly corrosive valve service poses a particularly tough problem in the process industries. To get *maximum* corrosion resistance, you have to pay for more than you need—high-alloy valves are expensive. And yet, ordinary cast iron often won't do the job.

An economical answer to many of these problems has been developed by Lunkenheimer with this new line of Nickel-Iron Gate Valves. Bodies and bonnets are 3% Nickel-Iron, for better corrosion resistance than ordinary cast iron, and trim is offered in choice of 18-8 (Type 316) Stainless Steel or Monel®, for maximum resistance at the point of most severe service. This combination is cutting valve costs in the petroleum field, pulp and paper, wood treating, and scores of other process industries.

This development is but one more instance that shows how nickel alloys can be used to provide significant advantages, whatever the equipment.

Many standard nickel alloyed compositions are available, making it easy to select one with extra qualities for almost any specific use. Whatever your industry, if you have a metal problem, send us details for our suggestions. Write today.

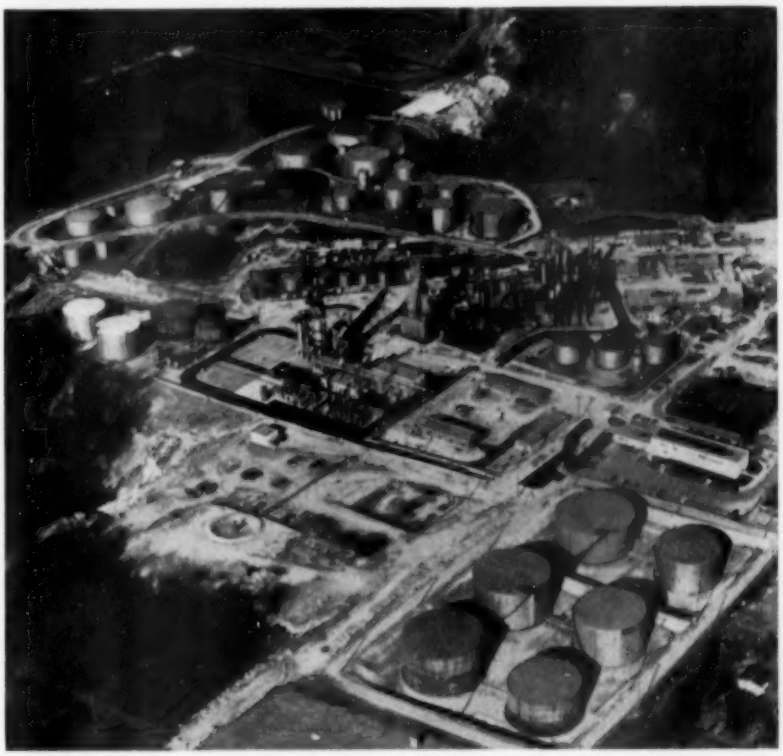
INCO

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

THIS WEEK . . . . . IN THE NEWS

INTERNATIONAL—A. S. Onassis attempts to sew up majority of world's oil tanker business by approaching Kuwait, Venezuela, and Iraq with deals similar to the arrangement he has with Saudi Arabia. . . . Industry, with U. S. and British government support, is prepared to fight deals. . . . Kuwait deal unlikely. . . . Venezuela and Iraq already have turned down offers. . . . ¶Big question of source of oil needs to be answered before true story is told of Jatibonico discovery in Cuba. . . . Seeps common in area of well. . . . More drilling is scheduled. . . . ¶Talks reopen in Teheran on deadlocked Iranian situation. . . . Consortium representatives optimistic. . . . Compromise on touchy managerial situation indicated. . . .

PIPELINES—Pacific Northwest Pipeline Corp. will begin construction immediately on its $160,000,000 natural-gas line from the San Juan basin to Washington. . . . FPC ends a 2-year struggle between Pacific Northwest and Westcoast Transmission Co. over which company would build lines to serve the area. . . . By decision, FPC favors domestic gas supply rather than Canadian which Westcoast planned to bring south from Alberta. . . . ¶Northern Natural Gas Co. applies for formal permits to build 24-in., 310-mile gas line across North Dakota. . . . North Dakota Natural asks public service commission to modify conditions imposed on its conditional permit for a line from Tioga-to-Fargo-to-Grand Forks. . . . Lignite companies go to court to try and halt invasion of gas as power fuel in North Dakota. . . . ¶Panhandle Eastern asks the FPC to grant temporary authorization to proceed with Mississippi River crossings involved in its proposed $66,750,000 expansion program. . . .



$15,000,000 EXPANSION of Shell Oil Co. of Canada, Ltd.'s refinery on Burrard Inlet in North Burnaby near Vancouver is completed. The new fluid catalytic cracking unit and light-ends recovery unit are shown at left center of this aerial photograph. The completed expansion also included polymerization and treating units in addition to the new office buildings at right center. The refinery was built in 1932 with a capacity of 3,500 bbl. daily. It was expanded to 6,000 bbl. in 1946 and to 9,000 bbl. in 1948. The recent expansion program gives it a capacity of 15,000 bbl. daily.

EXPLORATION—Big strike by Cities Service in Dora Roberts ranch area indicates large Ellenburger structure. . . Well flowed 142 bbl. first hour and 114 bbl. second hour of drill-stem test. . . . ¶Rotary rig being moved from Oklahoma to Sand Hills area of West Virginia to drill state's deepest well. . . . Hope Natural is operator of joint venture that includes Columbian Carbon, United Fuel, South Penn Oil, and Manufacturers Light & Heat. . . . ¶Imperial plans exploration in rank wildcat territory of St. Lawrence Valley between Montreal and Quebec. . . . ¶Nuco Petroleums starts 50-well program in Lloydminster field straddling Alberta-Saskatchewan border. . . . ¶Tide Water makes ninth strike in Saskatchewan since 1949 with discovery northeast of Shaunavon. . . .

PRODUCTION—Texas Railroad Commission approves water-flood project for Strawn sand underlying 3,180 acres in Manning-Harrington field, Throckmorton County, and receives seven more applications for flood approvals. . . . ¶Commission sets 16 producing days for July to cut 190,234 bbl. daily from allowable in June. . . . ¶Humble asks commission to permit expansion of gas-injection pressure-maintenance program in Fort Chadbourne field in Runnels County. . . . Company also wants to install two pilot water floods in field. . . .

IMPORTS—Reports to Texas Railroad Commission indicate rate of imports will drop in coming months. . . . May figure reached 995,000 bbl. daily of both crude and products. . . . Estimates for July and August are at a somewhat lower figure. . . . ¶ TIPRO executive committee votes to ask U. S. Tariff Commission to determine whether domestic industry is being harmed by imports. . . .

NATURAL GAS—TIPRO drafts three-pronged attack against federal control of gas production. . . . Support pledged to congressional action exempting production and gathering of natural gas from FPC regulations. . . . Also backs move to give Texas legislature jurisdiction over independent producers. . . . ¶Some producers threaten to price themselves out of market by setting gas prices too high, A.P.I. production division told at White Sulphur Springs.

DISCOVERY WELL of Pembina field was a milestone in Canadian oil history. The lonely signpost points prophetically to the south.

Pembina Field...1 Year Later

Frank J. Gardner

CALGARY.—Socony - Vacuum Oil Co. of Canada, Ltd., dates the history of Pembina oil field from July 1, 1953.

It was on that day that the company's 1 Pembina discovery well made final production tests showing a flowing potential of 6 bbl. of oil per hour, and a new field discovery was assured for west central Alberta. Not only a new field, but a new oil reservoir, the Cardium sand, was established in the Upper Cretaceous section.

This week, Pembina field will reach its first birthday. A great deal has happened in this first year; a number of predictions have been made; and many stories to fire the imagination have appeared in the nation's press. Estimates regarding the eventual size of the field, its possible reserves, and its effect upon the industry have ranged over a wide scale of superlatives.

A first-year appraisal of the area reveals that considerable doubt still exists about Pembina possibilities. That it is a big field, and a good one, is assured; that it is the largest in Canada is certain. But its development is going to be a long, slow process until the problems of access, productivity, and outlet are solved.

Early operations . . . Socony-Vacuum, with a half interest in the combined holdings of Seaboard Oil Co., Honolulu Oil Corp., Merrill Petroleums Ltd., and Cancoll Oil & Gas Ltd., spudded the discovery well of Pembina field on February 24, 1953. At that time, only three wells had been drilled within a 30-mile radius of the test. The Cardium sand had yielded showings of gas in the foothills area of western Alberta, but no porous developments of the sand had been noted in the plains area of the province.

The discovery well was drilled on a seismic anomaly and was intended as a test of Mississippian and Upper Devonian beds. On the way down, on March 16, 1953, operators ran a drill-stem test on the Cardium sand, but recovery was small and drilling continued to dry and deeper objectives to a total depth of 9,425 ft. A study of the electrical log indicated that the Cardium test tool had not been open to the best part of the sand. Casing was run, new tests were made, and a Cardium completion was recorded for the first time.

The second test of the Cardium, Socony-Vacuum et al 33-7 Drayton Valley, was a failure, and was located on a separate seismic prospect, but its importance lay in the fact that it established the existence of the Cardium stratigraphic pinchout 11½ miles northeast of the original discovery. The sand in the second well had very little porosity and consisted of silty and shaly sand, but showed considerable oil staining.

As one stepout after another extended the field, Alberta oil operators began to realize that the entire area between Calgary and Edson, a distance of more than 200 miles, was underlain by Cardium sand and that it presented productive possibilities of greater scope than any area in western Canada. The usual campaign of brash predictions and "hot" lease plays has followed.

Current status . . . Just how big is it? Conservative geologists attribute 267,520 proven and semi-proven acres to the field at the moment. This includes an area some 28 miles long (northwest-southeast) and 18 miles wide (southwest-northeast), with 39 wells completed to date. Of these wells, only 26 are within the field limits as defined by the Alberta Petroleum and Natural Gas Conservation Board on its June allowable order. These 26 wells are permitted to produce 121 bbl. each per day, for a total field allowable of 3,146 bbl. daily. The 13 outpost wells

TYPICAL EQUIPMENT used in geophysical exploration in the difficult terrain of western Alberta. Left to right are the recording unit, two Mawhew 200 drill units, and a water tank unit. A personnel carrier would complete the crew.

HASTY CONSTRUCTION activity features the Drayton Valley "building boom" as the small community prepares to accommodate the Pembina influx of oil business.

encompass an area of about 418 sections of land on which Cardium sand production is established.

It must be remembered, however, that this is only the initial stage in the development at Pembina. Actually, very little is known about the vast area lying west and southwest of the present field. No well yet drilled has encountered water. No well yet drilled has made any appreciable amount of gas. The first well to reach water will supply the first clue to any probable westward definition, . . . "and when and if we do find a water line," says one geologist, "it isn't likely that it will mean anything regionally . . . this is going to be one of those fields where you probably will never be able to draw a line and say 'this is it'."

Weather retarding 1954 program . . . Development of the field has been delayed a great deal by bad weather conditions since March. Drilling has been at a standstill, production has dwindled and allowables have not been met by the 26 producing wells, as the area flounders in mud and water. Unseasonably heavy rains have deluged the entire Pembina area, and this, combined with the difficult muskeg conditions in the western part of the field, has made the field inaccessible to any kind of transportation. Rusting drill pipe is a common sight as one flies over the field; derricks are abandoned and no activity is under way. A few weeks of dry weather will open the eastern portion to summer drilling, however, and operators anticipate that 12 to 15 wells per month will be completed between now and January 1, 1955.

Meanwhile, Canadians are preparing for the active development campaign to come. As the field grows, supplies and transport must be made available to it. Two small communities are located within the field area, at Drayton Valley and Buck Creek, and both are busily at work on plans for new buildings, utilities, air strips, housing, and supply facilities to serve the field. New roads must be built, bridges across the Pembina and North Saskatchewan rivers are a "must," and communications networks must be provided.

The field is traversed by two rivers, dividing the presently productive area into three sectors. There are no bridges or ferries in operation, and in order to go from one part of the field to the next, workmen must travel north to the nearest river crossing, sometimes as much as 30 miles away, and retrace their route on the opposite side. Other surface conditions present severe problems. Poorly developed or nonexistent road systems have made movement of supplies and equipment a virtual impossibility following the spring breakup and heavy rains. But road programs are already under way to bring the field into reach from both Calgary and Edmonton, and as these problems are solved, others will likewise disappear and Pembina development will be under way.

Development . . . The field is being developed on a spacing pattern of 80 acres at this time. Operators anticipate a recovery of 25 per cent of oil in place on this basis. "If we went to 40-acre spacing, we might increase recovery to 36 per cent, but how economic that might be is open to question, and will be until we know more about the reservoir,"—that is one geologist's opinion on recovery. Under the present spacing pattern, the proven field boundaries today would accommodate some 3,300 wells.

Development drilling has so far been concentrated in the immediate vicinity of the original discovery well, in Townships 47-49, Ranges 7 and 8. Completion procedures are fairly routine. Operators set 7-in. casing through the sand, land tubing 40 ft. above the Cardium, install the well head, pressure test the casing and tubing, and release the rig. After flow lines are in, casing is perforated and a sand fracture treatment is given the sand where necessary. "By 'where necessary'," said one operator, "I mean in nearly every case." Completion procedures are referred to as "semi-permanent."

Regional geology indicates greater size . . . The regional geological picture of Pembina is not unlike that of East Texas field. The Cardium, a broadly distributed sheet sand, outcrops in the foothills of the Canadian Rockies of western Alberta, dips down into the Alberta syncline on the subsurface, and on the eastern flank of the syncline, sweeps up to the east and pinches out without again appearing at the surface.

A detailed geological report on the field will appear in a later issue of the Journal, but an understanding of the regional nature of the sand occurrence is necessary to comprehend what the field might become. Pembina is too young to draw conclusions or even to make estimates, and the prevailing attitude in Alberta now is one of "wait and see."

Although the Cardium pinchout possesses a regional northwest strike, and would logically follow a shore line pattern, present development indicates that delineation of the field will involve many more dry holes along its eastern edge, as embayments, deltas, and promontories are outlined.

Developments to the northwest on the Shell Oil Co. holdings near Peers

and on the Imperial Oil, Ltd. block between Peers and the main Pembina field are good examples of this hazard. Although little information has been released on the results of wildcats now under way in that region, unconfirmed reports indicate disappointment with sand conditions to the northwest. Failures here could considerably dampen the fires of rash predictions for the "world's largest field." Should the Imperial sextet of wildcats fail to establish Cardium production, The Texas Co. block of four townships will assume the key role of outlining the field perimeter in the northwest.

Reservoir data . . . Pembina's problem is permeability. There are areas of Cardium production which yield flowing production without fracture treatment. Others will produce only after extensive treatment, and some are too tight to flow at all. Whether a more uniform condition will be found to the south and west of present production is still in doubt, but most operators feel that lateral extension of the field will only add to the problem.

There will be prolific areas, and there will be lean areas. There will be spots within the proven field where no production at all can be established. In short, the final picture of the field will be "spotty," not unlike the Spraberry Trend of West Texas. Permeability figures vary from 42 to 100 md., averaging about 45.

Porosity varies from 11.5 per cent to 16 per cent, but most well records reflect an average 15 per cent in the developed field.

The average well at Pembina is completed for a flow of 150 to 450 bbl. per day on a ⅜-in. choke. The oil is undersaturated, and is 37° A.P.I. with high wax content, and sulfur free. The average gas-oil ratio varies from 300-1 to 400-1. Connate water content is 30 to 35 per cent, and oil saturation varies 65 to 70 per cent.

The reservoir rock itself is a light yellowish gray, fine-grained sandstone, slightly silicified, with shale bands and strings throughout; some cross bedding is usually evident. In thickness, it averages 15 to 22 ft., and is found at depths of 4,620 to 5,500 ft. To date, about 700 ft. of relief is known to exist on the Cardium as it dips to the southwest at about 40 ft. per mile.

Reserves . . . Recent published estimates of reserves at Pembina have ranged from half a billion to 1¾ billion barrels. Each estimator took into consideration those factors he considered pertinent and added a nebulous "possible" at the end. But conservative figures indicate the proven reserve at present to be approximately 654 million barrels. The unknown factor lies now to the west, northwest, and southwest.

HOUSE TRAILERS for crews are part of the typical scene in Pembina field. Pembina wells require an average of 21 days from spudding to completion.

Undoubtedly, the reserve figure will grow. There is an inclination to doubt that Pembina is the biggest field on the continent, but certainly it is Canada's largest commercial oil deposit to date. At one time, reserve estimates soared to 7,500 bbl. per acre, but now the average figure quoted hovers around 2,500 bbl. per acre.

Summing up, it might be said that we have a big new field, whose productivity will be much less than that of East Texas, but far better than that of the Spraberry Trend field of West Texas. It's still growing, and if the weather permits, it will continue to grow at the approximate rate of one well per month per rig. Under favorable conditions, more than 20 rigs will be active. The completion of a pipeline outlet, scheduled for late 1954, will give added impetus to the development at Pembina.

New Refinery Contracted

ST. BONIFACE, Man.—North Star Oil, Ltd., will build a 12,000-bbl. per day refinery here.

Fred C. Manning, North Star president said, Canadian Kellogg Co., Ltd., has been awarded contract for the job, which will cost an estimated $10,000,000. The refinery will include atmospheric and vacuum crude distillation, naphtha reforming, fluid catalytic cracking of the Orthoflow type, gas recovery, catalytic polmerization, propane facilities, and caustic and copper chloride-treating units.

The plant is scheduled for completion in mid-1955.

Wildcat Area To Be Probed

TORONTO. — Imperial Oil, Ltd., soon will launch an exploration program in the rank wildcat area of the St. Lawrence Valley between Montreal and Quebec.

The company has received permits on 600,000 acres in four blocks along the south side of the river. Preliminary geological studies made during the past 2 years indicate a "modest" exploration program is justified for the area, according to W. A. Rolliff, manager of Imperial's eastern producing department. Rolliff said, however, it is doubtful that any fields comparing with western Canada's discoveries will be found in the St. Lawrence area.

Gravity meter surveys will be used to check surface geological work before drilling is started, which may not be until 1955. Imperial will operate through a subsidiary, Lowlands Exploration Co.

Previous drilling in the Three Rivers area dates back several years and resulted in only small gas flows which were commercially utilized for a short time.

50-Well Program Started

EDMONTON. — Nuco Petroleums, Ltd., has started a 50-well program in the border-straddling Lloydminster heavy gravity oil field.

Excelsior Refineries, Ltd., has contracted to purchase crude from the wells for 3 years. Donnell Drilling Co., Midland, Tex., is doing the drilling.

Crews currently are drilling in the first wells of the Blackfoot area on the Alberta side of the field, but it is reported the majority of the wells will be drilled on the Saskatchewan side.

Gas Absorption Plant Open

EDMONTON.—Progas Ltd., has placed its first gas absorption plant on steady production in the Big Valley area of central Alberta.

The new plant has a daily capacity of 1,500,000 cu. ft. of wet gas with a daily

output of 6,500 gal. of propane, butane and natural gasoline. The installation includes a sour-gas scrubbing plant and a packaged, skid-mounted absorption unit. The latter, designed for high propane recovery, is the first of its kind in Canada.

Progas has a second plant of similar design under construction 7 miles west of Edmonton to process the Acheson-Stony Plain area.

New Saskatchewan Strike

REGINA, Sask.—The Tide Water Associated Oil Co. group has made its ninth discovery in Saskatchewan since the start of operations in the province in 1949.

Tide Water recovered 2,950 ft. of 23°-gravity crude in a drill-stem test of the Jurassic at its 1 North Shaunavon Crown wildcat well. The wildcat is located 9 miles northeast of Shaunavon, 10½ miles northeast of the nearest producer in Leon Lake pool, 12½ miles northeast of Dollard Jurassic field, and 20 miles southeast of Gull Lake field. Location is LSD 1, 34-9-19w3.

Tide Water's discoveries in Saskatchewan since 1949 include two in the Leon Lake area, Eastend, Dollard, and Wapella fields, Rapdan pool, and the Mississippian strike in the Forget area of the Williston basin. A discovery at Clover was later included in Dollard field.

Cheap Gas Still in Future

JASPER, Alta.—Canada is still a long way from cheap natural gas even though the Trans Canada Pipe Line system now appears to be a near reality.

This was the warning voiced here by R. H. C. Harrison, president of the Canadian Petroleum Association, during the eighty-third annual meeting of the Canadian Manufacturers Association.

Harrison said in addition to the estimated $300,000,000 cost of constructing the system, the oil industry also will spend between $100,000,000 to $150,000,000 for wells, feeder lines, and separator plants.

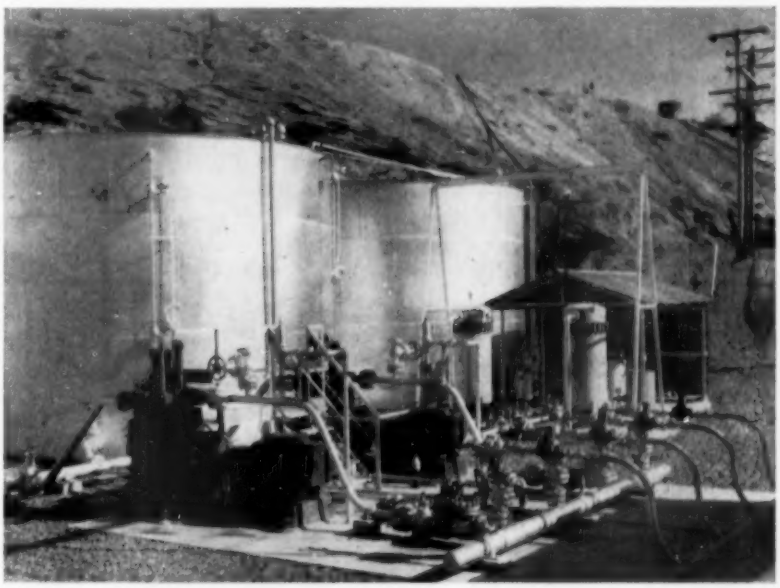
Harrison said he doubted that the public is aware of the huge investment required to develop the line, adding that "the investment will be made only if an adequate reward is returned for the risk taken."

Town Approves Unit Plan

WINNIPEG, Man.—The town council of Virden has accepted the proposal of Ponder Oils, Ltd., Calgary for the development of Section 22 of the Virden Roselea oil field, which underlies the town.

Ponder agreed to complete its unitization plan within a month after approval by the town council. The company has agreed to pay the town a cash bonus of $8,000 and will share equally all net operating profit after payment of well costs. Drilling is to begin within 1 year.

WEST COAST



SHELL'S COALINGA FLOOD operates with this equipment. Raw water collects in the tank at right and is filtered into the tank at left with diatomaceous earth added on the inlet side of the two filters. Injection is carried out by the two triplex pumps, regulated by float controls in the surge tanks. Water from the pumps enters a manifold from which the four lines at right lead to individual injection wells.

California pessimism fades as . . .

Water Floods Take Hold

D. H. Stormont

LOS ANGELES.—The California oil industry has lost most of its pessimism about water injection as a means of maintaining pressure in newer oil fields and for secondary recovery in its many older fields.

This is evidenced by the fact the state's first large-scale flood is preparing to get under way and by the number of experimental and small-scale floods recently started or planned.

Currently there are 29 projects in which water is being injected into oil zones. Total volume involved, nearly all of which is oil-field brines, is about 62,000 bbl. daily. Of these operations, however, nine are semidisposal projects. Partial pressure maintenance is being secured but not enough water is being returned to effect an adequate drive.

The remaining 20 are secondary-recovery projects for the purpose of increasing oil recovery. They account for 43,000 bbl. of the water being injected. Six of these, involving approximately 15,000 bbl. of water, were placed in operation during the past year.

Union Oil Co., a leader in laboratory and experimental field work, and Shell Oil Co. will be the first to attempt a full-scale flood. Early in July they will place first injection wells of a modified five-spot flood in operation at the Dominguez field. The joint operation will be carried out in a 4,000-ft. pool, using 17 injection wells.

Past hindrances . . . Because of several unfavorable characteristics of California oil sands the West Coast has lagged behind the rest of the oil country in use of water for secondary recovery and pressure maintenance. Some engineers now are wondering if these prob-

Mostly for Pipeliners . . .

WE'VE "moved the furniture around" a little bit in the Journal, and it may be that you have missed the "Pipeline" and "Natural Gas" pages you used to find in the back of the magazine.

The editors felt cramped in that spot, being limited to an even 30 column inches for both subjects, regardless of the events of the week. In order to expand our coverage, more space was needed. Too, it was felt that it would be most valuable to you as a reader to put news of the pipeline and gas industries together with news of related developments—bundle it all up in one complete and informative news section.

So, in this and all future issues, you will find pipeline and gas news —more than twice as much probably as you used to get in the back of the book—in this front-of-the-book news section. Don't miss in this issue, for example: The story on Pacific Northwest's big gas line; Panhandle Eastern's plans for a $67,000,000 expansion; Northern Natural's application for a 24-in. gas line to serve North Dakota; and Phillips Petroleum's application for a rehearing.

We hope you like the new layout—and the additional news.

lems have not been over-estimated.

In many ways California sands do not measure up to standards of sands being successfully flooded in Mid-Continent fields. Floods generally will not be as efficient, and more oil will be left in the invaded reservoir than in Mid-Continent fields. It is anticipated that many will prove economical, however, because the residual oil content before flooding generally is higher.

Chief characteristics tending to make for difficult water flooding are: (1) Average permeabilities are higher but uniformity is poor, leading to excessive by-passing; (2) they generally are much "dirtier," many contain clays which swell and act to lower the permeability when contacted with fresh water; (3) they are much thicker, which makes for difficulty in controlling the flood front; (4) crudes produced are heavier and much more viscous; and (5) average depth of California fields is greater so that costs would be higher.

As they gain more experience with flooding, engineers are finding methods of mitigating, surmounting, or by-passing these difficulties. In that of swelling clays, for example, proper choice of water and/or use of chemical additives have proved to be the answer at some projects. Much more is to be learned but the industry is in the process of collecting the necessary field experience and laboratory data as to how flooding can best be carried out.

An added impetus to water flooding, and gas injection, is resulting from the inability of California operators to find sufficient new crude reserves. With the supply-demand situation tending to become more adverse, they have been exhibiting more interest in secondary-recovery methods.

Dominguez project . . . First five injection wells at the Union-Shell project are expected to start receiving water early in July. Additional groups then will be added until 17 input wells are in operation. About 10,000 bbl. of the field's 15,000-bbl. daily water production will be returned through them. The remainder already is being utilized in trial floods being carried on in fault-block pools of the third and fifth zones. Both of these have been under way since 1947.

In addition to being California's first large-scale flood, the first-zone project is unusual in that it is being carried out jointly without the properties being unitized. This will be accomplished through building up a pressure ridge of water along the boundary separating the Shell and Union properties. The latter company, which will operate the surface water facilities, will regulate water input to both properties to maintain the water barrier and prevent oil migration.

Pilot floods . . . Trial floods being carried on at Richfield, Orcutt, Wilmington, and Russell Ranch have proved successful or given indications such will be the case. A small flood carried on at Tapo Canyon for the past 3 years also is thought to be successful from the little data available.

In a shallow upper Terminal pool in the Harbor area of the Wilmington field, a trial flood by Long Beach Oil Development Co. has arrested pressure decline. In addition, gas-oil ratios of the three wells completed in the pool (a fourth was only recently completed) have declined from about 800 to 400 cu. ft. per barrel.

An interesting feature of this project is the use of ocean water, obtained from a 120-ft. well to take advantage of natural filtration provided. Injection of more than 1,000,000 bbl. of water during the past year has shown ocean water compatible with formation waters. A second well shortly will increase the amount available for injecting into the two input wells to about 15,000 bbl. daily. By stepping up the injection rate to 7,000 bbl. daily, leakage from the small fault-block pool to adjacent pools will be more than offset and will permit a faster pressure buildup.

At Russell Ranch, where Richfield Oil Corp. is unit operator, trial floods started last July in the Norris and Dibblee pools have shown indications of success. The field's entire water production of about 9,000 bbl. daily is being returned.

Two separate but local pilot floods also were started in the Eastside Coalinga field last year, one by Shell Oil Co. and the other by Standard Oil Co. of California. The latter was taking about 7,700 bbl. daily of water at the first of the year. Shell's has not been under way long enough to show definite results.

Texaco Discovers New Pool

LONG BEACH.—The Texas Co. has scored a new pool discovery which promises to justify the $100 per acre bonus and about 42 per cent royalty it paid the city of Long Beach for a lease on the 1,040-acre municipal airport east of Signal Hill.

On a 24-hour test, the well, 1 Long Beach Airport-2, flowed 465 bbl. of 31°-gravity crude through an 18/64-in. bean, with production coming from about 8,300 ft.

Texaco's first test of the lease yielded a noncommercial well.

Ohio Perforating Deep Well

BAKERSFIELD, Calif. — Ohio Oil Co. is continuing to perforate at its deep Paloma field test, which holds the world's drilled depth record at 21,482 ft.

After having perforated the interval at 17,035-17,135 ft., officials believed it would be 3 or 4 days before production tests could be made because of the high pressures and temperatures under which the shooting was being done.

Deep Test Planned

Falcon Seaboard to move heavy rotary rig from Oklahoma to extend cable-tool hole to West Virginia's deepest test

Neil Williams

PARKERSBURG, W. Va.—A heavy-duty rotary rig, largest and one of the few ever to operate in West Virginia, is being moved from Oklahoma for a deep exploratory test in the old Sand Hills area, 20 miles east of here.

The test, designated as 96-34 Powers Oil Co., is a joint venture of Hope Natural Gas Co., as operator, with Columbian Carbon Co., United Fuel Gas Co., South Penn Oil Co., and Manufacturers Light & Heat Co., as participants. Location is 100 ft. off U. S. Highway 50, near the Ritchie-Wood county line.

Drilling is projected to approximately 12,000 ft., the greatest depth by far ever reached in the state. This depth should carry the hole to granite, through all possible productive horizons, including the Cambrian section.

Hole already has been drilled with cable tools to approximately 4,300 ft., where 9⅝-in. casing has been run. When drilling was started about 2 years ago, it was planned to drill much deeper with cable tools. Water encountered at the present depth, in Oriskany sand of lower Devonian age, and the need for running another string of casing, decided the operator to continue the test with rotary equipment.

Rig from Oklahoma . . . Drilling contract for deepening the test has been given Falcon Seaboard Drilling Co., of Tulsa, which will move in a rig from western Oklahoma. It is a Unit U-20 assembly, powered by three LRO gas engines, totaling 1,000 hp., and including a 20-in. Gardner-Denver pump, and an 18-in. Wheeland pump for mud circulation.

Dismantling of the rig for moving is under way. The heavier equipment will be transported by rail, and the lighter and smaller parts hauled by truck. A large, standard derrick already is on location.

The contractor expects to start below the present 9⅝-in. casing with 8¾-in. hole, the largest that can be drilled through that size of pipe. Plans call for diamond coring of at least 4,000 ft. of the projected hole. Although little is known of formations and conditions at the depths to be explored, exceptionally hard digging is anticipated. Drilling contract is on a day-rate basis.

Prospective horizons to be penetrated include the Clinton sands and limestones, of Silurian age, major source of production in fields to the north in Ohio and western Pennsylvania. So far, the deepest productive horizon in West Virginia has been the Oriskany sand, now a major objective in the active development of deep gas production in north central Pennsylvania.

Contractor is pioneer . . . Falcon Seaboard pioneered rotary drilling in West Virginia in 1940. At that time, it drilled three exploratory tests, all for Hope Natural Gas Co., in Lewis County, between Weston and Clarksburg. The deepest went to 10,000 ft., one to 8,000 ft., and the other to 7,500 ft. Later, during World War II, it moved the rig to the New Martinsville area, on Ohio River, in Wetzell County, where it initiated the drilling of a series of 6,800-ft. brine wells for a wartime chemical plant.

Only one other rotary rig is now working in the state. It is operated by John Moran on a test being drilled for United Fuel Gas Co. in Jackson County. Nearby on the Ohio side of the river north of Marietta, the contractor has another rotary drilling on a test for Tennessee Production Co.

Chemical Plant Contracted

PASCO, Wash. — Columbia River Chemicals, Inc., has awarded Fluor Corp., Ltd., a contract to design and construct a $12 million chemical and fertilizer plant on the Columbia River near here.

The plant, the first major project of its kind in the Northwest, will produce 160 tons per day of anhydrous ammonia, 110 tons per day of urea, and 140 tons per day of ammonium sulfate. Of these amounts, 50 tons of ammonia, and 15 tons per day of urea will be for industrial use with the remainder going for agricultural uses.

The synthetic ammonia plant will be designed to generate hydrogen from Bunker C fuel oil for combination with nitrogen from the air to produce anhydrous ammonia. The plant will also be designed to use natural gas as a raw material when it is available in the area.

Fluor has been working on process design for over 2 months and expects to start field work this fall with the completion date set for the latter half of 1955.

Another Ammonia Plant Begun

TUSCOLA, Ill. — Another farmlands ammonia plant is under way here adjacent to the petrochemical complex operated by National Petro-Chemicals Corp. The new unit is being built by the M. W. Kellogg Co., for National Distillers Products Corp., part owner of National Petro-Chemicals.

A synthesis step similar to that used in other Kellogg-designed plants will be utilized. A quench-type reactor allows optimum temperature control, and the synthesis process is closely controlled since reaction temperature is near the deterioration temperature for the catalyst. *(The Oil and Gas Journal, March 8, page 86.)*

The new unit will utilize most of the 8,000,000 cu. ft. per day of hydrogen produced in the main plant's ethylene unit, to produce anhydrous ammonia at the rate of 50,000 tons per year. It will cost about $7,000,000 and will require 11,520,000 g.p.d. of water, 8,000 kw. of electricity and 7,000 lb. per hour of steam. Completion is slated for late this year. Foundations are being poured in the foreground for the ammonia synthesis facilities. The unit in the background is a sulfuric acid plant.

Industry Briefs

EDMONTON. — Shell Oil Co. is planning to use two helicopters and a light aircraft in making an Arctic oil survey this summer. H. G. Bassett and M. E. Wopford will supervise geologists making the survey, which will cover the area along the Mackenzie River between Fort Simpson and the Arctic coast.

REGINA, Sask.—The name of Socony-Vacuum Exploration Co. has been changed to Socony-Vacuum Oil Co., of Canada, Ltd. The company's regional organization remains unchanged.

DALLAS.—Stonewall Gas Products Co., Inc., announced last week that work is about half completed on construction of more than 100 miles of 2 to 10-in. gathering system for its natural-gasoline plant in Katz field in northeastern Stonewall County, Texas. Completion of the system is set for about the middle of August. The new lines will handle up to 15,000 M.c.f. of gas daily from Old Glory, Boyd, Flowers, Upshaw, West Flowers, Guest, Aspermont Lake, and Frankirk fields in the county. Contract for line construction is held by Vaugn & Taylor Construction Co., Odessa, Tex. Residue gas from the plant will be taken by Lone Star Gas Co. through a new 17½-mile, 8-in. line soon to be constructed.

AUSTIN. — Petroleum Dehydrating Co. has petitioned the Texas Railroad Commission for permission to set up a temporary treating plant to process about 25,000 bbl. of tank bottoms at Humble Pipe Line Co.'s Mildred pump station in Navarro County, Southwest Texas. Treated oil would be shipped to Bareco Oil & Refining Co., Barnsdall, Okla.

CAMDEN.—The Mississinewa, first of a group of five ships which will be among the largest fleet oilers in the U. S. Navy, was launched here recently by New York Shipbuilding Corp. The vessel, which displaces 40,000 tons when fully loaded, is designed to carry fuel for a Navy task force.

NEW YORK.—The American Petroleum Institute has established a Meritorious Safety Award that will be given members of the petroleum industry for outstanding acts of heroism and first aid. The award is sponsored by the Safety and Fire Protection Section of the institute's technical services department.

CHICAGO. — Transportation companies will be using more than 2,000 buses operating on L.P.G. by the end of 1954, according to a survey conducted by the Liquefied Petroleum Gas Association. Survey revealed that 1,663 L.P.G. buses were operated during 1953—an increase of 16 per cent over the previous year. Another 411 buses are on order for delivery this year.

ALASKA

Lease Block Sought

Fairbanks firm hopes to assemble big unit for test

FAIRBANKS.—A concerted effort is being made by a group of Fairbanks business men to assemble a 100,000-acre block of oil leases in Interior Alaska south of the Brooks Range.

These individuals, organized as Fairbanks Oil & Gas Co., Inc., already have completed preliminary exploratory work on an area of 784 sq. miles and hope, when leasing is completed, to interest a major oil company in testing the area as unit operator.

Since individual leases are limited to 15,360 acres, the company is attempting to interest enough private citizens in the project so that a 100,000-acre unit can be formed.

Fairbanks Oil & Gas was formed in February 1953 by 154 citizens of Fairbanks. President of the company is Bud Meyeres, real estate operator. Other officers are Fred Stevens, druggist, vice president; and E. C. Wallace, business man and accountant, secretary-treasurer.

In April last year, the company engaged Andrew Milek, now with DeGolyer & MacNaughton, to prepare a geologic study of the general area. Since then, the company has sur-

veyed the area, made a surface geological study, and financed an aerial photography and photogeologic evaluation program for the area, exact location of which has not been disclosed.

Alaskan Firms Set to Drill

ANCHORAGE.—Two new drilling ventures are preparing to spud in at the Cook Inlet area of Alaska's southern coast.

Iniskin Unit Operators, Inc., plans to be under way with its wildcat by July 15. Company officials said that more work needed to be done on the rig which was waiting in the bay after being barged from Seattle.

Alaska Gulf Oil & Gas Development Corp. has plans for starting a wildcat in the near future in the Goose Bay area of Cook Inlet. The firm holds a 72,000-acre block between Wasilla and Goose Bay where the test will be drilled.

MID-CONTINENT

New Oklahoma Formula

Industry committee suggests basing allowables on depth of wells and spacing pattern; hearing scheduled for August

Henry D. Ralph

OKLAHOMA CITY.—A new proration formula for Oklahoma which would base allowables on the producing depth and spacing pattern of each well has been recommended by a special industry committee appointed by the Oklahoma Corporation Commission last winter.

The draft was prepared by the committee on general rules and regulations and is subject to minor revisions by the general coordinating committee before being formally presented to the commission. A public hearing will be held by the commission, probably early in August, before adoption of new rules.

The proposed rules direct the commission to classify all pools in the state according to depth and spacing pattern and to assign to each well a normal allowable as shown in the accompanying table. Proration to market demand would then be accomplished by applying a uniform percentage increase or decrease to all well allowables.

The new formula is designed to provide a practical means for adjusting production to market demand without causing inequities among fields. Since last fall the commission has been attempting to reduce production but actual production has always exceeded the estimates made when allowables were set, and cutbacks have affected some fields far more heavily than others.

The depth-acreage table is an attempt to allocate output in proportion to costs of drilling and producing and is based on a study of the costs of drilling more than 800 wells in the state during the past couple of years. It is believed that around three-quarters of the state's wells would not be able to make the allowables assigned them in this table, and also that the formula would give a faster payout to shallow zones than to the average of all wells in the state.

In prorating to market demand, the commission could not reduce the per-well allowable below certain minimums: 10 bbl. per day for zones less than 2,000 ft. deep; 15 bbl. for 2,000 to 5,000 ft.; 25 bbl. for 5,000 to 8,000 ft.; and 35 bbl. below 8,000 ft.

All allowables would be set by wells rather than by pools and could not be transferred among wells on a lease except in the case of high gas-oil ratio wells or on waterflood or unitized operations. An allowable would not be set for a well until the operator has filed a completion report. There is no specific provision in the tentative rules for granting discovery allowables.

Stricter rules for dealing with overages and underages during a month are provided in the new regulations, and reporting requirements on producers and transporters are tightened.

Water-flood and pressure-maintenance operations are made subject to proration, but it is provided that operators may file protests which would prevent a reduction from taking effect until the commission could hold a hearing on that project. In such operations the well allowables could be transferred among wells and output based on a unit allowable representing the total of both injection and production wells.

Purchasers would be required to make monthly nominations by the tenth of the preceding month, and to designate the areas or districts from which they desire to purchase. However, the commission would not be required to fix different allowables for different areas though it is expected to find this information useful in determining market demand.

The proposed general rules and regulations, which cover 46 pages, also revise or restate existing regulations on such subjects as directional drilling, dual completions, plugging methods, fire hazards, production tests, gas-oil ratios, well locations, pressure maintenance, and other usual operations.

Depth-Acreage Factors for Well Allowables

(In barrels per well per day)

Average depth of pool (in feet)	10 Acres or less	20 Acres	40 Acres	80 Acres
0- 2,000	25	——	——	——
2,000- 3,000	30	40	——	——
3,000- 4,000	38	48	68	——
4,000- 5,000	47	57	77	——
5,000- 6,000	60	70	90	——
6,000- 7,000	75	85	105	——
7,000- 8,000	95	105	125	——
8,000- 9,000	118	128	148	——
9,000-10,000	150	160	180	——
10,000-11,000	188	198	218	258
11,000-12,000	237	247	267	307
12,000-13,000	300	310	330	370
13,000-14,000	380	390	410	450
14,000-15,000	475	485	505	545

Pipeline Company Expands

TULSA.—Sun Pipe Line Co. is selling 78 miles of lines in Oklahoma to Mid-Continent Pipe Line Co. The sale, effective July 1, includes all of Sun's facilities in Oklahoma.

The lines handle 2,400 bbl. daily from 72 leases in the Yale-Quay and Drumright areas. The lines range in diameter from 2 to 6 in.

Mid-Continent is the largest transporter of crude direct from leases in Oklahoma. The company owns and operates 2,100 miles of pipelines and daily moves about 65,000 bbl. of crude. The company is a wholly owned subsidiary of Mid-Continent Petroleum Corp.

Panhandle Eastern wants green light for...

...$66,750,000 Line Expansion

WASHINGTON. — Panhandle Eastern Pipe Line Co. asked the Federal Power Commission last week to speed up action on its $66,750,000 expansion program.

The company asked for temporary authorization to go ahead with about a third of the project to increase the capacity of its Texas-Michigan pipeline. The company said weather considerations, especially as they affect Mississippi River crossings, the necessity of ordering pipe in advance and contracting for construction crews make quick action necessary if it is to provide the 200,000 M.c.f. or more of additional gas which Panhandle's customers could use.

The company asked specifically for a certificate for that part of the program covering work on the main transmission lines, where it proposes to lay 294.6 miles of additional pipe at intervals to complete the third parallel main transmission line along the greater part of the system. The additional line, to cost $22,218,447, would permit an increase of 100,000 M.c.f. daily in Panhandle's peak capacity.

The Mississippi River crossing would be in the form of two 24-in. lines laid in a trench beneath the river bed. Panhandle engineers explained that while most of the new line can be laid in about 90 days, the river crossing will take at least 150 days. If the commission grants the temporary authority the company hopes to start work early next month to complete the river crossing before cold weather forces a suspension of construction. Six other river crossings also are to be made, but none of the engineering magnitude of the Mississippi crossing.

Tanker Bill Drafted

Government could buy old ship, give credit on new

WASHINGTON. — Legislation authorizing the Secretary of Commerce to buy old tankers for the Merchant Marine reserve fleet and grant trade-in credits on new and faster ships is being prepared for a House vote.

The Government is seeking to build up a fleet of fast tankers.

The measure, sponsored by Rep. Thor C. Tollefson of Washington, limits the trade-ins to vessels owned by United States citizens. The vessels must weight 1,350 gross tons, be more than 10 years old, and in "satisfactory" condition.

The allowance for privately built vessels is not to exceed the purchase price, plus the costs of improvements capitalized and allowed for federal income tax purposes. Similar requirements are made for ships purchased from the Government under the Ship Sales Act of 1946.

A major amendment made by the Merchant Marine Committee of the House authorizes the Government to pay for national defense features on new tankers built under the program. These features would not normally be used by the operators, but the amendment is designed to guarantee that high-speed features of new vessels would be used for the national defense.

The bill authorizes the program to continue until July 1, 1958. Any tankers taken in by the Government on trade-and build deals would go into the national defense reserve fleet.

Gas Rehearing Asked

Phillips asks Supreme Court to reconsider its decision; Texas, Oklahoma, New Mexico will make a similar request

WASHINGTON.—Phillips Petroleum Co., has asked the Supreme Court to reconsider its June 7 decision giving the Federal Power Commission jurisdiction over its natural-gas sales to interstate pipelines.

The states of Texas, Oklahoma, and New Mexico have been given permission to file petitions for reconsideration by July 2. The court will not act on these petitions until its October term. Its judgment will become final and its mandate issued to FPC soon unless a stay is issued by a justice who voted with the majority.

Phillips' petition for reconsideration went deeply into congressional debates during consideration of the Natural Gas Act and said that the court did not need to disregard the literal meaning of the exemption for production and gathering nor adopt a strained construction in order to determine congressional intent.

The company also stressed that the decision creates a conflict between state and federal jurisdiction which needs clarifying because it "leaves the Federal Power Commission, the states, and the industry with no legal landmarks to guide them through the area of conflict and confusion which has been created by the court's decision."

Sen. Lyndon B. Johnson of Texas has asked President Eisenhower to create a commission to make a study of the problems raised by the Phillips decision and to make recommendations for legislation at the opening of the next session of Congress in January. He suggested that the commission include representatives of FPC, the industry, state agencies, and private citizens.

FPC One Member Short

WASHINGTON. — The Federal Power Commission currently is one member short with the expiration of the term of Dale E. Doty. No successor has been nominated by President Eisenhower.

Doty, who joined the Interior Department in 1939 as a field aide at the United Pueblo Indian Agency in Albuquerque and rose to become Assistant Secretary for Public Land Management, was appointed to the FPC by former President Truman in May 1952. He succeeded former chairman Mon C. Wallgren. His term ended June 22.

Research Lab Nears Finish

WASHINGTON.—The new experimental station of oil and gas research of the Bureau of Mines is nearing completion at Morgantown, W. Va.

The new building will enable the department to centralize its research which is now being carried on at West Virginia University, Morgantown, and Franklin, Pa.

Personnel and equipment used in experimental production of synthesis gas and technicians engaged in petroleum and natural-gas research will be the first occupants of the building.

Natural-Gas Briefs

WASHINGTON. — South Carolina Natural Gas Co. has become the first company to be declared exempt from provisions of the Natural Gas Act under the Hinshaw Amendment by the Federal Power Commission. The amendment provides that any company which purchases natural gas at or within a state boundary is exempt from the Natural Gas Act if all of the gas is consumed within the state and the rates, services, and facilities are regulated by a state commission.

COLUMBUS, Ohio.—Ohio Fuel Gas Co. has completed a $3 million line paralleling its transmission line between Sugar Grove and Cedarville, Ohio. The original 65-mile line was begun in 1951.

WASHINGTON.—Federal Power Commission presiding examiner has filed a decision authorizing Arkansas Louisiana Gas Co. to construct pipeline facilities which will increase the company's peak-day delivery from 670 million to 816 million cubic feet of natural gas. The new facilities to be constructed by the company include 136 miles of line and a 10,500-hp. compressor station. The new program will cost $10,072,305.

WATCHING WASHINGTON

Bertram F. Linz

More Control Threatens

A situation is building up in Washington which experienced observers of Congress warn threatens increased government control of industry.

It is a dealers' revolt against the practices of the automobile manufacturers and is being closely watched by distributors in other industries who believe their suppliers don't give them a fair break.

The car dealers complain the manufacturers force them to take more cars than they can sell. As a result, they allege, a number of dealers have been forced out of business and bootlegging of new cars to used-car dealers and a breakdown of territorial boundaries have developed.

Currently the dealers are negotiating for new franchise contracts to eliminate this and other abuses, but if they are not successful they plan to appeal to Congress for relief. They already have had discussions with the Justice Department on the antitrust aspects of the matter.

Observers say if Congress finds it necessary to regulate the selling practices in the automobile industry it will likely be asked to take similar action in other industries. The major complaints from various industries deal with full-line forcing, sales quotas, prohibitions against dealing in competitive products, and similar policies. The idea of suppressing these practices by legislation probably would have the support of the Federal Trade Commission.

Natural Resources Plan

Ten major projects aimed at development and conservation of natural resources have been mapped for study during the next 5 years by Resources for the Future.

The studies have been made possible by a further grant from the Ford Foundation, which underwrote the organization's original recent conference to enlist nation-wide support of the recommendations of the Paley Materials Policy Commission.

A major project will be a further study of the role of energy in the economy.

Another "problem area" noted by R. G. Gustavson, president of the organization, is the development of principles and methods for evaluating resource development projects and programs, both public and private.

Resources for the Future also will study the need for continuing or periodic studies and appraisals of past trends, current position, and the future outlook for resources development and use; the economic and administrative factors in industrial use of atomic energy; the role of resources development in regional and national economic development, and the need for encouragement, extension and improvement of education and training in resources fields.

Detroit Case May Reopen

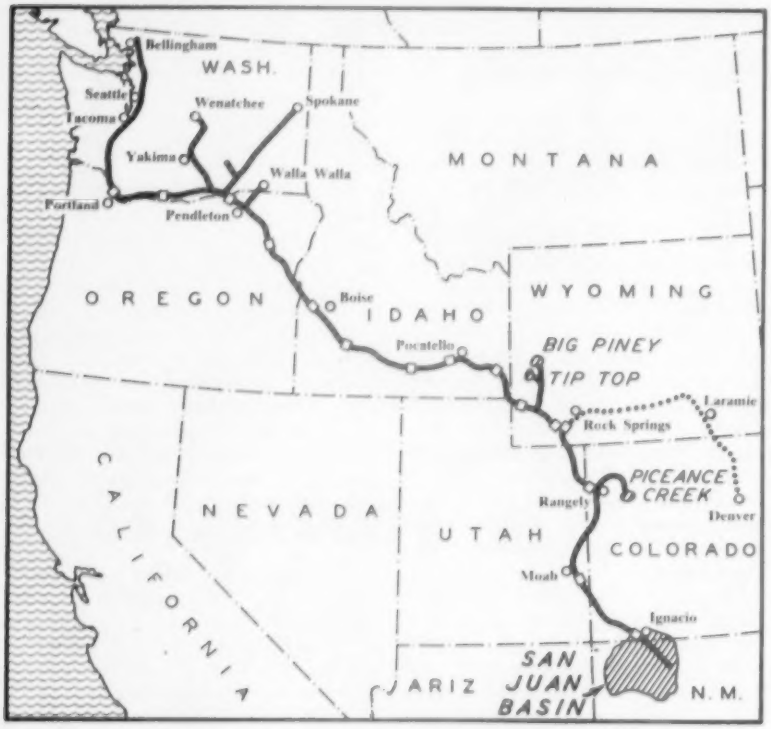
The Federal Trade Commission is making a big production out of the challenge by Standard Oil Co. (Ind.) of the order issued last year to carry out the mandate of the Supreme Court in the so-called Detroit case.

There are indications the commission may reopen the case to reconsider its order.

The company charged the revamped findings on which the commission based its latest order were designed to circumvent the court's ruling. It also suggested they clash with the commission's own interpretation of the scope, meaning, and purpose of the "meeting competition" defense, and raised the question of whether any valid order is now in effect.

A number of jobber and other organizations immediately filed their own views with the commission and asked permission to file briefs. As a result of this pressure, the commission has set up a 30-day period for the submission of briefs, and will allow a further period of 20 days in which FTC counsel will file his brief. Thereafter, probably sometime in August, the commission will decide what it will do.

For some months, the commission and the company have been sitting tight, each apparently waiting for the other to move. Now, if the commission refuses to change its order, one or the other will have to take action—the commission to bring enforcement proceedings in the courts or the company to apply to the courts for review.



PACIFIC NORTHWEST'S proposed route. The dotted line is Colorado Interstate's proposed route and the squares locate proposed compressor stations on the two lines.

Gas Line Start Near

Pacific Northwest wins over Westcoast Transmission, will build pipeline from San Juan; FPC favors domestic supply

WASHINGTON.—Pacific Northwest Pipeline Corp. will begin construction "as soon as possible" on a $160,000,000 natural-gas line from the San Juan basin to northern Washington.

The Federal Power Commission has granted the company approval to build the big line, ending a 2-year fight to serve the only remaining section of the United States without natural gas.

In granting Pacific Northwest Approval, the FPC voted to favor a domestic supply of gas for the area rather than imported gas. The five other applicants proposed to import gas from various Canadian fields.

The major opposition to Pacific Northwest was Westcoast Transmission Co., whose future plans are fogged by the FPC denial. Other applicants were Trans-Northwest Gas, Inc., Northern Natural Gas Co., Northwest Natural Gas Co., and Glacier Gas Co.

The huge project—one that will send 1,899 miles of pipeline into seven states—is expected to spur drilling activity along the southern portion of the route, particularly in the San Juan basin where Pacific Northwest is committed to purchase or drill 280 wells. Several shutin fields also are expected to be reopened as result of the new outlet for gas.

One immediate result will be the construction of 365 miles of 22-in. line by Colorado Interstate Gas Co. from Pacific Northwest's system near Rock Springs, Wyo., to Denver. This $23,298,653 project, which was approved concurrently with the big Pacific Northwest line, will enable Colorado Interstate to transport gas received from Pacific Northwest to market areas in Colorado and Wyoming.

Colorado Interstate is scheduled to start the spur-line construction early next summer and finish the job for the 1955-1956 heating season. Pacific Northwest construction is expected to cover two construction seasons and be completed for deliveries in late 1955.

Principal issue . . . The major issue in selecting a company to serve the big northwest area was the source of the gas. The commission held it would not be giving the fullest protection to prospective consumers if the sole source was through imports from a foreign country without some intergovernmental agreement assuring a continued supply.

The commission agreed that if one of the companies planning to import gas received approval, the company's "judgments and actions would be essentially dependent upon public opinion within that country rather than upon the interests of the American consumers."

The applications were investigated and considered 2 years. Hearings were held for nearly 200 days and more than 28,000 pages of testimony were taken and over 600 exhibits presented.

Gas source . . . The principal source of gas for Pacific Northwest's line will be the San Juan basin. In testimony given the FPC, Pacific Northwest said it has "contracted and proved reserves" in San Juan totaling 3.646 trillion cubic feet. The company has a contract with Phillips Petroleum Co. for the San Juan gas.

Pacific Northwest also has contracts for gas from the Piceance Creek field in Rio Blanco County, Colorado, the Tip Top field in Sublette County, Wyoming, and Big Piney field, northeast of Tip Top.

Market . . . The company's market estimates range from 92,582,211 M.c.f. of gas in the first year to 122,972,337 M.c.f. in the third year. Maximum day firm sales range from 231,300 M.c.f. the first year to 319,300 M.c.f. the third year. Gas from the line will be marketed in Idaho, Oregon, Washington, Colorado, Utah, and Wyoming.

Route . . . The line will run 1,466 miles from Ignacio, Colo., at the northern tip of the San Juan basin, to Bellingham, in northern Washington. The system will have 106 miles of supply laterals and 327 miles of sales laterals, bringing the total pipe to 1,899 miles. Fourteen compressor stations are planned. Eight will be constructed immediately and the remainder during the first year of operation.

The pipe will range in diameter from 4 in. planned for some of the sales laterals to 26-in. pipe planned for the

387-mile stretch from Ignacio to the Colorado Interstate junction. The 680 miles of main line from the Colorado Interstate junction to the Spokane lateral will be 22-in. pipe.

Westcoast's future . . . Westcoast Transmission made a determined bid throughout the 2-year fight, but the future of the company is doubtful now that it has been denied a United States market for its gas. The company previously admitted building a line without a United States outlet would not be economically feasible.

The company proposed to build a line from the Peace River field in North-Central Alberta west to the Fort St. John field in British Columbia, then south to Vancouver. The line would extend into the United States and terminate at Portland. The company had all clearance from Canadian authorities to build the line and export the gas.

Ray C. Fish, president of Fish Engineering Corp., is chairman of the board of Pacific Northwest. C. R. Williams is president. Williams is a former vice president of the Chicago Corp.

Gas Charge Denied

Montana-Dakota asks for hearing on lease threat

MINNEAPOLIS.—Montana - Dakota Utilities Co. has requested a hearing on a Montana Land Board order that it start drilling within 30 days or surrender 12 oil and gas leases on state land in Fallon County, Montana *(The Oil and Gas Journal, June 21, page 127)*.

F. R. Gamble, vice president and treasurer of Montana-Dakota, denied Land Board charges that the company had not diligently developed its properties on the Cedar Creek anticline.

"Montana-Dakota is unit operator of the shallow gas sands, which have been diligently drilled and efficiently produced. In 1936 when our company drilled a deep well on the anticline we formed a deep drilling unit.

"Upon the discovery of oil in the Williston basin the deep rights were turned over to Shell Oil Co., which has discovered oil at Little Beaver, Pine, Cabin Creek and is drilling on the anticline, if not on our state leases near them. I do not understand the position of the attorney general (Arnold Olsen, also a member of the Land Board, upon whose complaint the board acted) in saying that the gas and oil operations are not being carried out diligently. We are carrying out the obligations of the leases."

Gamble said, "Naturally as the supply of gas and pressure declines the state has obtained less royalty as the years advance," but all the gas consistent with good conservation and marketing was being produced.

Of the board's order to end underground storage of gas produced elsewhere Gamble said, "None of the wells on state land is being used as an injection well. If any gas stored in other parts of the field migrates to the state wells the state receives royalty on the gas as it is produced so we cannot understand why gas should not be stored in the field."

Gamble said considerable federal land also is in the units and "there has been no complaint from federal authorities" about Montana-Dakota's operation of the unit.

Line Plans Confused

Northern Natural formally asks permit to build 24-in., 310-mile North Dakota line; earlier plan still pending

BISMARCK, N. D.—More hearings are in prospect before the question of selling North Dakota natural gas is settled. Three developments last week muddled the situation:

. . . Northern Natural Gas Co. of Omaha applied to the Public Service Commission for a certificate to build a 24-in., $18,494,000 natural-gas pipeline system from Tioga to Fargo with laterals to serve 10 other cities. Construction would begin in 1955, with five more cities to be added in 1956.

. . . North Dakota Natural Gas Transmission Co. of St. Paul, which on May 24 received conditional approval of a certificate for an $8,700,000 Tioga to Fargo to Grand Forks line, petitioned the commission for modification of six conditions required for certification. Three of the conditions involve North Dakota Natural's contract to purchase gas from Amerada Petroleum Corp.

. . . North Dakota lignite companies filed an appeal from the commission's May 24 order in Burleigh County District Court here, alleging that the commission failed to protect the economy of the lignite industry by permitting gas to displace lignite as power-plant boiler fuel. Cited is a section of North Dakota public utility law which declares promotion of lignite use is the public policy of the state.

A hearing on Northern Natural's proposal was set for August 2. Meantime, Commission Counsel R. W. Wheeler said he will file a motion in Burleigh District Court this week asking that the appeal of the lignite companies be dismissed. Wheeler said he will argue that the commission's order is not yet final and therefore not appealable.

Northern Natural plans . . . The company proposes to build its 24-in. line from a point south of Tioga, where Signal Oil & Gas Co. is building a natural-gasoline plant, 310 miles diagonally across the state to Fargo.

This would also be the Omaha company's trunk pipeline to bring Alberta gas to Minneapolis-St. Paul.

Northern Natural said it is negotiating with Trans-Canada Pipe Lines, Ltd., to take from 100 to 150 million cubic feet of Alberta gas daily at a point north of Tioga instead of south of Winnipeg. The latter is proposed in Northern Natural's dormant application with the Federal Power Commission to import Canadian gas.

In addition to its Canadian purchases, Northern Natural says it intends to buy approximately 30 million cubic feet of gas at Tioga or "elsewhere in the Williston basin." To date the only major supply of gas in the Williston basin is gas produced with oil on the Nesson anticline, where Amerada is the major operator.

In 1955 Northern Natural proposes to build its $15,078,000 main line and laterals to Tioga, Stanley, Minot, Velva, Drake, Harvey, Fessenden, Grand Forks, Mayville, Casselton, and Southwest Fargo.

The 1956 program would include laterals to Devils Lake, New Rockford, Carrington, Jamestown, and Valley City.

North Dakota Natural . . . The commission has not yet set a date for hearing on North Dakota Natural's request that the commission modify its conditions for certifying the line *(The Oil and Gas Journal, May 31, page 52)*.

The commission had given North Dakota Natural 30 days to meet the conditions but last week the deadline was suspended until further order.

The pipeline company said it cannot meet all conditions because "a substantial compliance . . . depends on the acts and decisions of other parties."

Three of the modifications concern commission orders for changes in its gas-purchase contract with Amerada Petroleum Corp.

The commission had ordered that

enough wells be drilled to the Silurian formation to provide 30 million cubic feet of gas daily on a standby basis by September 30, 1956.

C. F. Kelsch, attorney for the pipeline, said North Dakota Natural was seeking to broaden the contract area to include Madison formation gas from Charlson, Hofflund, and other oil pools in addition to Beaver Lodge and Tioga. In addition to providing more Madison gas the company asks modification of the Silurian requirement so the deep formation can be developed "consistent with sound policy and economy."

The commission had ordered that North Dakota Natural have an option but not be required to take all gas in excess of contract obligation. The counterproposal is that Amerada's contract will set a limit on the amount of gas which the pipeline company will be obligated to buy as new supplies develop.

The commission ordered stricken from the Amerada contract a clause increasing the price of gas according to price hikes in No. 6 fuel oil in barge lots at Houston. Proposed is substitution of the wholesale price index as compiled by the Bureau of Labor Statistics.

Two orders concern financing.

Under present circumstances the pipeline company cannot guarantee to start construction by August 15, as ordered, Kelsch said.

North Dakota Natural has started work on right-of-way and has engaged the Hoppe Pipe Line Service Co. of Kansas City as consulting engineers.

North Dakota Allowable Set

BISMARCK, N. D.—The North Dakota industrial commission has set 15,425 bbl. as the daily allowable of crude oil to be produced in the state in July.

The daily unit allowable for individual wells producing from 5,000 ft. or less was set at 13 bbl. The amount of production for deeper wells increases in proportion to their depth.

New Gas Line Planned

COLORADO SPRINGS.—Colorado Interstate Gas Co. is planning a 70-mile natural-gas line to provide initial service to Fort Morgan, Colo., and increase service to Denver.

Company officials said last week an application for permission to build the line will be filed as soon as all gas producers in the area have signed contracts with Colorado Interstate.

ECONOMICS

Imports Due Reduction

May imports top company estimates slightly, but reporting firms plan shipment reductions in July, August, September

IMPORTS in May were above company estimates, but plans have been made to reduce shipments that were previously scheduled for coming months.

Companies reporting to the Texas Railroad Commission imported 995,700 bbl. of crude and products in May. This total represents an increase of 2.2 per cent over the May estimates reported to the commission a month ago.

All of the gain was in crude. Previous estimates of crude imports for May totaled 687,700 bbl. daily. The current May total of 723,500 bbl. daily was 5.2 per cent above the estimate. Product imports for May dropped 4.9 per cent from estimate made last month.

Totals for the coming months reflect reductions reported by some of the importing companies. The June total for all companies reporting to the commission has been cut 3.9 per cent to 905,700 bbl. daily.

Compared with last month's forecast, total imports for July will be down 3.0 per cent, August down 4.3 per cent, and September down 3.6 per cent. Most of the cut for June and July is in product imports.

Company reports in the past have covered about 92 per cent of total imports. If this ratio holds true for the next few months, imports for the third quarter will average slightly less than 1,000,000 bbl. daily.

IMPORTS*

(Thousands of barrels daily)

	Actual		Estimated or forecast				
	April 1954	May 1954	June 1954	July 1954	Aug. 1954	Sept. 1954	Oct. 1954
CRUDE—EAST COAST:							
Atlantic Refining Co.	60.2	71.5	60.8	60.8	60.8	60.8	60.8
Cities Service Co.	7.0	13.3	17.8	9.7	14.8	18.6	21.3
Eastern States Pet. Co.	4.3	4.9	5.3	4.5	7.3	4.5	4.5
Gulf Oil Corp.	93.0	145.0	134.0	112.0	111.0	116.0	129.0
McBride Oil & Gas Corp.			3.3	6.4	6.5	6.7	6.5
Phillips Petroleum Co.	6.6	6.6	6.7	6.4	6.4	6.7	6.4
Sinclair Oil Corp.	60.4	61.6	66.0	66.0	66.0	66.0	66.0
Socony-Vacuum Oil Co.	89.0	90.0	89.0	89.0	89.0	89.0	86.0
Standard Oil Co. of California	66.2	85.5	68.0	68.0	68.0	68.0	68.0
Standard Oil Co. (Ind.)	16.5	20.3	13.5	16.5	16.8	13.9	13.4
Standard Oil Co. (N.J.)†	85.0	81.0	79.0	79.0	79.0	79.0	79.0
Sun Oil Co.	7.6	14.5	7.5	7.3	7.3	11.7	7.3
Tide Water Associated Oil Co.			4.0	7.5	11.4	7.5	11.4
The Texas Co.	46.1	66.2	45.0	53.0	53.0	50.3	34.5
Total East Coast	541.9	660.4	599.9	586.1	597.3	598.7	594.1
CRUDE—WEST COAST:							
Standard Oil Co. of California	17.6	31.2	18.9	18.9	18.9	18.9	18.9
Tide Water Associated Oil Co.	7.9	10.7	23.3	19.6	11.5	11.5	11.5
The Texas Co.	4.4	21.2	4.5	22.9	10.0	10.0	10.0
Total West Coast	29.9	63.1	46.7	61.4	40.4	40.4	40.4
Total United States	571.8	723.5	646.6	647.5	637.7	639.1	634.5
PRODUCTS:							
Asiatic Petroleum Co.	1.1	9.6	9.0	6.0	6.9	10.0	10.0
Eastern States Pet. Co.	20.0	16.0	22.0	22.0	22.0	22.0	22.0
Gulf Oil Corp.	6.0	2.0	4.0	9.0	10.0	10.0	10.0
Shell Caribbean Pet. Co.‡	72.0	77.0	80.0	70.0	60.0	90.0	120.0
Shell Oil Co.	25.7	16.2	11.8	20.9	16.3	19.1	14.8
Socony-Vacuum Oil Co.	10.4	3.4	10.3	8.5	8.5	8.5	8.5
Standard Oil Co. (Ind.)§	13.4	20.0		16.6	14.9	15.3	21.5
Standard Oil Co. (N.J.)†	149.0	128.0	122.0	114.0	114.0	114.0	169.0
The Texas Co.	3.4			3.4	3.4	3.5	3.4
Total products	301.0	272.2	259.1	270.4	256.0	292.4	379.2
Total crude and products	872.8	995.7	905.7	917.9	893.7	931.5	1,013.7
Bonded fuel included¶	55.7	62.5	70.3	66.6	63.7	66.8	65.7

*From company reports to the Texas Railroad Commission. †Based on quarterly estimates. ‡Imports by independent distributors. §Received through suppliers who can furnish either domestic or foreign oil. ¶Mostly duty free for bunkering ships in foreign trade.

CITATIONS FOR SERVICE were presented the three men at right last week by John G. Pew, Sun Oil Co., Philadelphia, left, at the A.P.I. meeting of the Eastern District of the Division of Production. Recipients are, left to right, E. T. Heck, Minard Run Oil Co., Bradford, Pa.; Fred C. Newman, Old National Bank, Evansville, Ind.; and Vance W. Orr, McClure Drilling Co., Mount Pleasant, Mich. Pew is A.P.I. vice president for production.

Gas-Price Warning

Robinson tells A.P.I. district meeting latest increases threatening to drive some companies out of the market

WHITE SULPHUR SPRINGS, W. Va.—Some independent producers are setting their gas prices so high that they are threatening to price themselves, as well as some pipeline and distributing companies, out of the market.

This warning was laid before the Eastern District of the American Petroleum Institute's Division of Production here last week by J. French Robinson, president of Consolidated Natural Gas Co., New York.

"In some of our territories No. 6 fuel has taken some of our commercial load away from us recently," Robinson said. "In other areas," he added, "the price of gas for heating purposes can now be undersold by No. 2 fuel oil by as much as 4 to 18 per cent."

Robinson told the production men here that while it was generally agreed that the field price of gas a few years ago was too low, "most of us now agree the price is getting too high." "Favored-nation" clauses going into effect "nearly from month to month," he said, have forced distributing companies to propose a tremendous number of rate increases affecting the consumer.

Prices near limits . . . The average field price of gas to the independent producer in the South and Southwest now varies from 8 to 18 cents per thousand cubic feet, Robinson said. Pipeline companies serving the Appalachian area receive from 24 to 34 cents per thousand. The distributing companies, he continued, receive from 60 cents to $1.25 per thousand.

"It is quite evident," Robinson declared, "that these prices to the consumer cannot continue to go much higher, particularly along the seashore areas where oil may be brought by tanker at minimum cost."

Robinson described as "a step in the right direction" the Federal Power Commission's plan to investigate escalator and favored-nation clauses in gas-purchase contracts "particularly as to whether any of these or similar contract provisions have any reasonable relation to the economics of producing, gathering, or transporting natural gas."

New officers . . . Paul G. Benedum, Hiawatha Oil Co., Pittsburgh, was elected chairman of the district for 1954-55.

Eight district vice-chairmen also were elected. They are James M. Bird, Bird Well Surveys, and Douglas Rogers, Jr., South Penn Oil Co., both of Bradford, Pa.; Jack Cashell, Preston Oil Co., and Lysle R. Kirk, Ohio Fuel Gas Co., both of Columbus, Ohio; J. Robert Hornor, Delaware Gas Co., Clarksburg, W. Va.; Fred C. Newman, Old National Bank, Evansville, Ind.; O. L. Martin, McClure Oil Co., Alma, Mich.; and Richard J. Murdy, New York State Natural Gas Corp, Pittsburgh.

Harry M. Brown, Chartiers Oil Co., Pittsburgh, was named secretary-treasurer.

Ready For Duty In Any Waters

Halliburton Oil Well Cementing Co. recently commissioned and placed in service the Halliburton 207, the world's second ocean-going cementing ship. The 207 is designed to navigate either the ocean or in shallow water. It is 126 ft. long and 32 ft. wide and powered by twin screws, each operated by a 275 hp. diesel engine. The ship has a draft of 7 ft., 8 in. when fully loaded and a minimum draft of 4 ft., 10 in. Cementing power is provided by two Howco T-10 pumps. Bulk capacity is equivalent to 3,500 sacks. Halliburton has one other ocean-going cementing ship in service and is constructing a third.

Ranch Hopes Get Boost

Big, new Ellenburger strike by Cities Service just out of Dora Roberts ranch acreage suggests large structure

Carl Hoot

MIDLAND.—A third discovery in the Dora Roberts ranch area indicates the possibility of a large structure, having a thick Ellenburger section, in southwestern Midland County, Texas.

Dora Roberts ranch is jointly owned by Forest Oil Corp. and Cities Service Oil Co. *(For details on the first test on ranch land, see The Oil and Gas Journal, June 21, page 110.)*

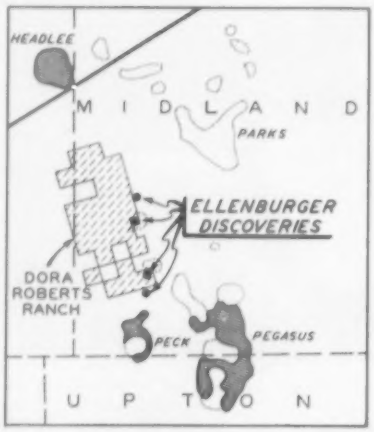
The latest Ellenburger prospect for this area is Cities Service 1 Parks, which flowed 142 bbl. the first hour and 114 bbl. the second hour of a drill-stem test which covered the first 52 ft. of Ellenburger section. Gas-oil ratio on the test was 1,100 cu. ft. and maximum flowing pressure was 5,055 psi.

Location of this well in 14-41-T3S-T&P Survey, is the northernmost spot on the accompanying map, designated "Ellenburger discoveries." It is on acreage wholly owned by Cities Service and adjoins the Dora Roberts block.

Past and probable future . . . A look into probable outcome of deep development on Dora Roberts land adjoining acreage may be had from formation tops and potentials of the four discoveries on the map.

. . . Sinclair Oil & Gas Co. 14 Sanders was the first Ellenburger producer in what was previously a large undrilled area. It adjoins the Dora Roberts block on the south. Top of the Ellenburger here was 13,175 ft., minus datum point of 10,268 ft. The well finished as a dual completion, pumping 137 bbl. of oil a day from the Fusselman, but flowed 1,136 bbl. of 53° oil a day through 30/64-in. choke from the Ellenburger.

. . . Forest and Cities Service 1 Roberts C-4 was the initial test and first discovery on Dora Roberts ranch. Location on the map is second discovery from the south. Top of the Ellenburger was 13,076 ft., minus 10,171 ft., or around 97 ft. high structurally to Sinclair 14 Sanders. Potential from the Ellenburger was 3,205 bbl. a day through 1-in. choke. It is interesting to note that drill-stem tests of the Ellenburger in each of these wells made relatively poor showings.



. . . Warren Petroleum Corp. 1 Wallin, third discovery from the south on the map, was the third Ellenburger well for the area. This well completed for 671 bbl. a day through 48/64-in. choke. Top on the Ellenburger was 13,300 ft., minus 10,396 ft., or 225 ft. low when correlated with Forest and Cities Service 1 Roberts C-4. It offsets Pennsylvanian production in Virey field, and adjoins Dora Roberts ranch land.

. . . Cities Service 1 Parks, not completed at this writing, has made a heavy flow on preliminary tests, as described earlier. This well ran high on the Ellenburger. Tentative formation top, by samples, was 13,018 ft., or minus 10,140 ft.

On the basis of these wells, outlook for another large producing structure between Headlee and Peck and Pegasus fields is good. Distance is approximately 5½ miles between the northern and southern discoveries shown on the map.

Multiple pays possible . . . Virey field, which adjoins the Roberts ranch land on the eastern side, central portion, has excellent production from the Pennsylvanian. Its first Ellenburger exploration was Warren Petroleum Corp. 1 Wallin.

Warren Petroleum opened Pennsylvanian production last year at its 1 and 2 June Sanders tests. This area lies immediately to the northeast of Forest and Cities Service' Dora Roberts discovery.

Warren 2 Sanders drilled to the Pennsylvanian and completed in that formation. The 1 Sanders was drilled to the Ellenburger, topping it by samples at 13,340 ft., or minus 10,439 ft. This would figure 268 ft. low to Forest and Cities Service' discovery.

Operators on 1 Sanders recovered 450 ft. of oil and 180 ft. of heavily oil and gas-cut mud on a drill-stem test in the Ellenburger from 13,354-90 ft. However, mechanical troubles made it necessary to cement drill collars at total depth, 13,390 ft., and complete in the Pennsylvanian. Potential from that formation was a calculated 1,176 bbl. per day through ¾-in. choke. None of the wells, including Warren 1 Sanders with its low top, encountered formation water in the Ellenburger.

Units Approved

Manning-Harrington flood among five projects OK'd

AUSTIN.—The Texas Railroad Commission has approved Woodson Oil Co.'s application for unitization of Strawn sand production underlying 3,180 surface acres in Manning-Harrington field of Throckmorton County, North-Central Texas.

At the hearing on the formation of the unit June 10, Woodson Oil told the commission that all of the operating interests and all but one small royalty holder had signed the unit agreement. A water-flood program, previously approved for the field by the commission, is expected to recover more than 3,390,000 bbl. of additional oil.

The commission also approved four water or gas-injection projects during the past week, all in North Texas, and heard application for three more, all in West Texas.

Applications for new water floods were submitted by:

. . . R. J. Reishman for the 1,625-ft. Yates sand underlying its Iowa Realty Trust and Pecos Valley Co. leases in Pecos Valley Low Gravity field, Pecos County, West Texas.

. . . Buckles & Hostetler for the Yates underlying its Walling and Costley lease at 2,450 ft. in South Ward field, Ward County. Two injection wells.

. . . F. Howard Walsh for the Yates underlying at 2,300 ft. his F. C. Green and Clive Killough leases in South Ward field. Eight injection wells.

The approved projects were proposed by:

. . . S-J-S Oil Co. for the 450-ft. Fry sand underlying two leases in Shackel-

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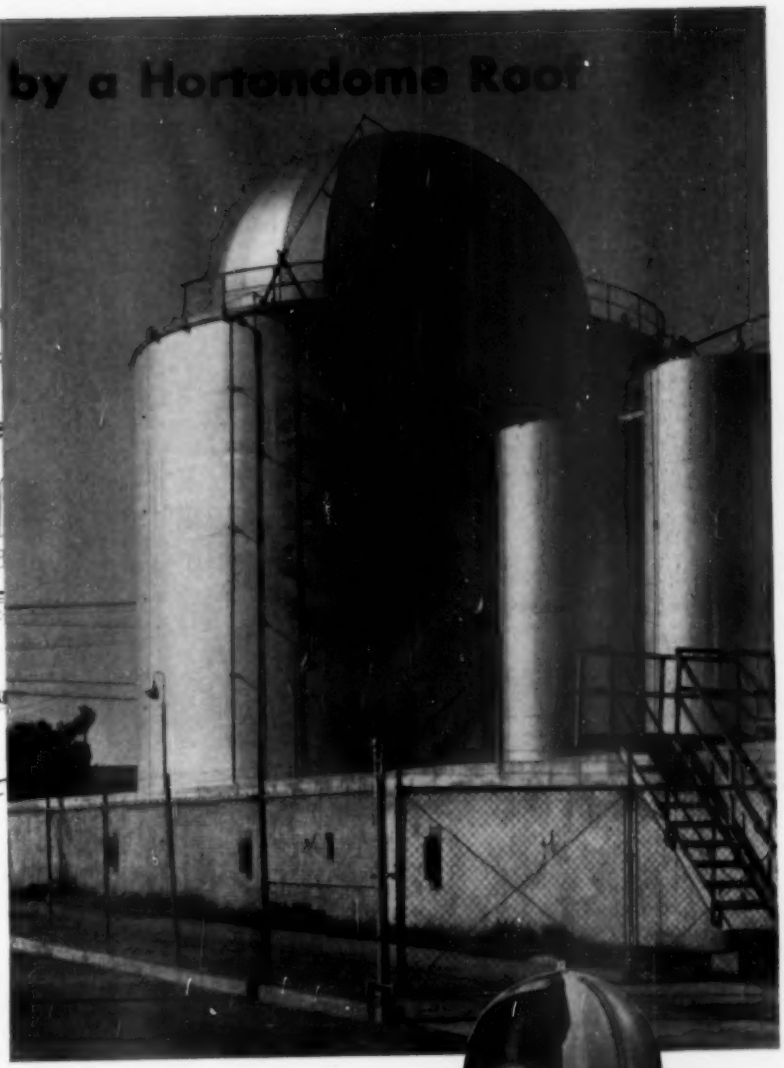

Above: 15,000-bbl., 48-ft. diam. by 48-ft. high, flat-bottom tank with 20,000-cu. ft. Hortondome Roof built for the Shell Oil Company at Los Angeles.

Above: Cutaway view showing the construction of the Hortondome Roof.

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Boston, 10 ..... 1025-201 Devonshire St.
Chicago, 4 ..... 2128 McCormick Bldg.
Cleveland, 15 ..... 2204 Midland Bldg.
Detroit, 26 ..... 1514 Lafayette Bldg.
Houston, 2 ..... 2119 C & I Life Bldg.
Los Angeles, 17 ..... 1523 General Petroleum Bldg.
New York, 6 ..... 3347–165 Broadway Bldg.
Philadelphia, 3 ..... 1615–1700 Walnut Street Bldg.
Pittsburgh, 19 ..... 3228 Alcoa Bldg.
Salt Lake City, 4 ..... [illegible] West 17th South St.
San Francisco, 4 ..... 1554–200 Bush St.
Seattle, 1 ..... 1325 Henry Bldg.
Tulsa, 3 ..... 1606 Hunt Bldg.

REPRESENTATIVES AND LICENSEES

Horton Steel Works Limited, Fort Erie, Ontario, Canada
Ateliers et Chantiers de la Seine Maritime, Paris, France
Constructions Metalliques de Provence, Arles-sur-Rhone, France
Chicago Bridge & Iron Company, Ltd., Apartado 1348, Caracas, Venezuela
Comprimo, N. V., 21, Amstel, Amsterdam (C) Netherlands
Compagnia Tecnica Industrie Petroli, Rome, Italy
Whessoe Limited, Darlington, England
Motherwell Bridge & Engineering Company, Limited, Motherwell, Scotland
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ford County Regular field, Shackelford County. Water flood. Six injection wells.

... **R. O. Coe** for the 1,980-ft. Tannehill sand underlying two leases in Montgomery field, Jones County. Water flood. One injection well.

... **William Crawford and R. L. Davidson** for the Bluff Creek sand under their Roberts leases in Jones County Regular field, Jones County. Water flood. Twelve input wells.

... **R. McCasland,** trustee, for the 1,000-ft. Gunsite underlying the Campbell Fee lease in F. B. H. P. field, Young County. Gas injection. Two input wells. Vacuums to be installed on six wells.

Texas Allowable Cut

Railroad Commission sets 16 producing days during July to cut 190,234 bbl. daily from allowable set for June

SAN ANGELO.—Allowable production of crude oil in Texas has been set by the Railroad Commission at 2,801,704 bbl. per day, a reduction of 190,234 bbl. per day below the June allowable.

This was accomplished by allowing only 16 producing days, state wide, during the 31-day month of July as compared with 17 producing days during the 30-day month of June. Nominations submitted prior to the hearing totaled 2,882,186 bbl. daily.

At the monthly hearing on market demand, held this time in San Angelo, most crude purchasers nominated on the basis of 16 days' production. Sinclair Crude Oil Co. had submitted written nominations for 17 days but changed this to 16 days at the hearing. Spokesmen for Sun Oil Co. and Magnolia Petroleum Co. said they nominated for 17 days but would acquiesce in a lower allowable.

Ralph O. Dietler of Stanolind Oil Purchasing Co. recommended 15 days' production to work off surplus stocks.

"If excess stocks are not reduced the industry will face chaos," he said, "but if supply is held down for 30 to 60 days the situation may be corrected." Dietler said his company has increased its stocks of crude by 2,000,000 bbl. since January 1 against its wishes.

J. C. Edwards of The Texas Co. said that in nominating for 16 days' production in Texas his company recognized that national stocks are burdensome and is following a consistent policy by reducing its scheduled imports and recommending lower allowables in Kansas, Oklahoma, Louisiana, and New Mexico. He said the Louisiana allowable for July is 614,000 bbl. daily, compared with estimated production of 659,000 bbl. daily in June and 713,000 bbl. daily in May.

The supply situation was pointed up by Chairman Ernest O. Thompson in a statement opening the hearing, in which he said:

"The Bureau of Mines estimate of market demand for Texas crude oil for the month of July 1954 is 2,810,000 bbl. per day.

"This oil can come either from current daily production or from storage, or a combination of both sources—current daily production and orderly withdrawal from excessive storage.

"During the week ending June 5, Texas crude in aboveground storage increased by 208,700 bbl. per day, or a net increase of 1,461,000 bbl.

"Total nation's crude oil in storage was 278,549,000 bbl. This is in excess of needs as testified to when our survey was made lately in open hearing for that purpose.

"Gasoline storage was 173,704,000 bbl., up 15 per cent over same date 1 year ago.

"There is being reported some 174,000 bbl. of crude being offered with no takers on the Gulf Coast.

"This would indicate current oversupply of crude above current requirements and above needed storage for orderly operation of the industry.

"Gasoline sales have not come up to predicted increases of market demand. The general estimates were from 4 to 5 per cent increase above last year's sales. The increase has been only about 1½-2 per cent.

"Refinery runs have been consequently excessive.

"Current production in Texas is 2,751,075 bbl. per day from our 150,000 producing oil wells."

The July allowable by districts, with reductions from the rates as of June 12, is as follows:

District—	July	Reduction
1—Southwest	46,625	1,629
2—Southwest	133,818	11,924
3—Gulf Coast	442,083	26,275
4—Southwest	246,052	16,865
5—East Central	46,081	3,212
6—Outside East Texas	114,321	9,030
6—East Texas field	219,224	19,835
7-B—West Central	148,000	9,446
7-C—West Central	196,931	16,241
8—West Texas	877,185	64,568
9—North Texas	224,735	10,814
10—Panhandle	105,649	395
Total	2,801,704	190,234

Big Drill Collars Push Down Jumping Pound Wells

Some of the biggest drill collars ever used are being employed on Shell Oil Co's Rig No. 1 on this and other wells in the Jumping Pound field of Alberta. This well, the Drilling Unit 12, is being drilled with collars with an 11¼-in. o.d. and 3-in. i.d. Hole size is only 12¼-in. Not only do the big collars hold hole deviation to a minimum, but they also prevent the rapid changes in hole angle that cause keyseats and stuck pipe. Average drilling time is reduced almost one-half by the use of the big collars.

TIPRO Maps Attack

Texas independents plan campaigns for Congress, state legislature to remove gas industry from control of FPC

SAN ANGELO.—A three-pronged attack against federal regulation of gas production was mapped by the executive committee of the Texas Independent Producers and Royalty Owners Association at its quarterly meeting here June 17.

The association will give all-out support to congressional legislation specifically exempting the production and gathering of natural gas from regulation by the Federal Power Commission now that the Supreme Court in the Phillips Petroleum Co. case has interpreted the Natural Gas Act as giving FPC that authority.

TIPRO will also participate in the forthcoming FPC investigation of escalator clauses and other provisions of contracts for the field sale of natural gas to pipelines, and will file a brief opposing any interference with the right of producers to sell their gas on their own terms.

Reverse policy . . . In something of a reversal of policy, the executive committee voted to support efforts to secure legislation giving Texas jurisdiction over independent gas producers. This was interpreted as meaning minimum-price legislation and perhaps other state regulations which might prevent the federal Government from moving into this field.

"Such action is clearly necessary now to preempt that regulatory field from federal control and regulation, said Jack Woodward of Dallas, president of TIPRO. "The Supreme Court decision in the Phillips case authorizes FPC price fixing at the well head of all gas going into interstate commerce. We must act soon or we will see the risky business of finding and producing natural gas made an unprofitable utility."

Imports, too . . . Imports of foreign oil was also an important subject of discussion at the meeting. The directors voted to proceed at once with a petition to the U. S. Tariff Commission to act under the so-called escape clause of the Reciprocal Trade Agreements Act to determine whether the domestic industry is being harmed by excessive imports. The commission has authority to recommend to the President an increase in duty on any product upon finding that a domestic industry is being injured.

The date for the next annual meeting of TIPRO was set for March 27-29, 1955, in Fort Worth.

Unit May Expand

Humble wants to step up gas input, start flooding

AUSTIN. — Humble Oil & Refining Co. last week laid plans before the Texas Railroad Commission for an expansion of the present gas-injection pressure-maintenance program in Fort Chadbourne field in Runnels County, West Texas, and installation of two pilot water floods in the field.

Humble engineers asked that the company be permitted to add a new gas input well No. 9 in Tract 28 to provide a better sweep of the Odom lime. Gas has been injected since March 1953 into the Odom around the edges of the field through the present 12 input wells. More than 8 billion cubic feet of gas have been injected into the reservoir without evidence of channeling by the first of this month.

The pilot water-flood operations would be carried out on the west and northeast edges of the field. From 100 to 600 bbl. of water daily would be injected into the Odom under about 2,000 psi. pressure. Water would be supplied from wells drilled to the Canyon Reef or Coleman-Junction formations.

The Fort Chadbourne unit was approved by the commission in July last year *(The Oil and Gas Journal, July 27, page 210)*, and the peripheral gas-injection program endorsed in mid-December. The project takes in 17,100 acres. Additional oil estimated to be recoverable via gas-injection was estimated at 9,500,000 bbl.

Record Hole Going Deeper

FORT WORTH. — Gulf Oil Corp. was drilling ahead at 17,012 ft. early last week in its record deep test, 1 P. G. Northrup, Reeves County, West Texas.

Gulf suspended drilling in this Delaware basin well in May 1953 at a total depth of 16,696 ft.—a drilling-depth record for West Texas. The company reentered the hole last month and surpassed the depth record for the entire West Texas - Southeast New Mexico region shortly after.

The Delaware basin record was held at 16,705 ft. by Richardson & Bass' 1 Harrison-Federal in the southeastern corner of Eddy County, New Mexico. This well was abandoned last month in Wolfcamp sediments of lower Permian age after shows of gas and distillate in a Perman sand at around 12,320-35 ft. proved noncommercial *(The Oil and Gas Journal, May 31, page 56)*.

The Gulf well is about 24 miles southwest of Pecos in the southeastern portion of the Delaware basin. Gulf so far has set no definite depth objective for the well. The heavy-duty rig on the job is reported capable of drilling to 22,000 ft. The hole was believed to be in Pennsylvanian formations at its old total depth.

Contractor on the project is Parker Drilling Co.

Gas-Contract Help Asked

DALLAS.—The Texas Mid-Continent Oil and Gas Association is inviting other oil and gas organizations to help defend escalator clauses and the so-called favored-nation provisions in gas-sales contracts at a hearing before the Federal Power Commission September 30.

The hearing has been called by the commission to consider whether these contract provisions are justified.

Harry W. Bass, president of Texas Mid-Continent, said the association is preparing a brief which will be submitted by July 30.

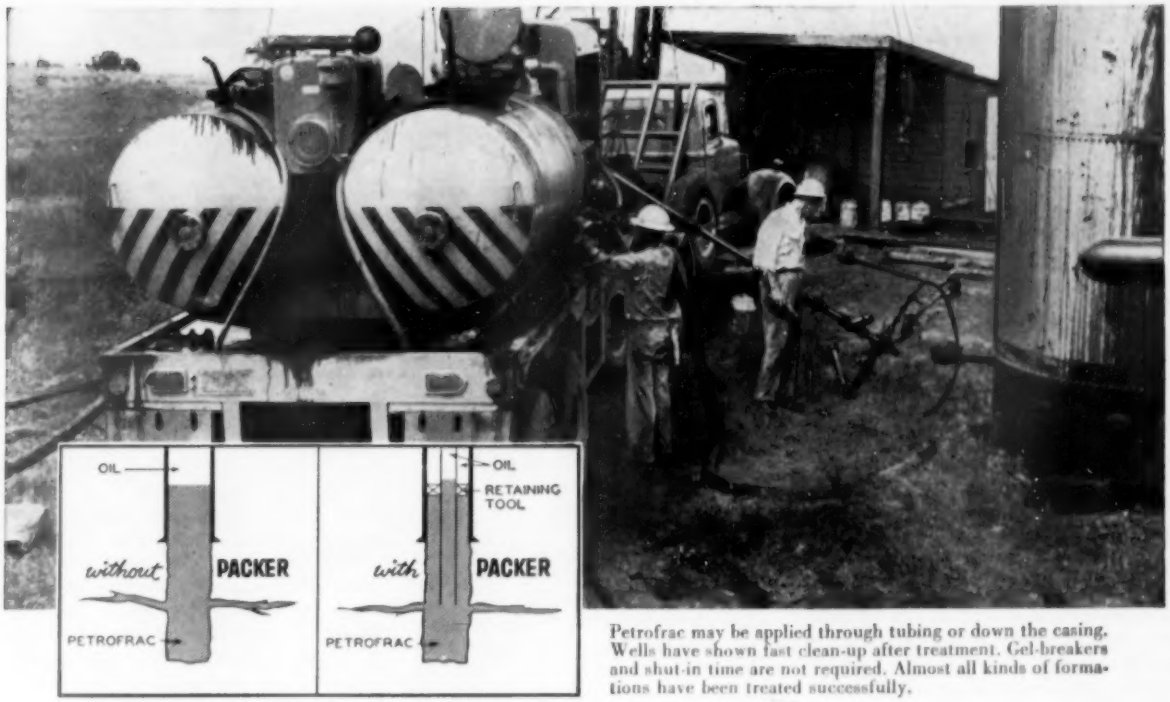
Gas purchasers, Bass said, are required by FPC to obtain 20-year contracts for gas supplies. Escalator clauses, he said, provide increases in field prices to offset inflation and other economic forces during these long periods.

Without such provisions, Bass declared, producers and royalty owners are, in effect, subjected to a price freeze on their gas.

Price Sells Wells, Leases

BALLINGER, Tex.—E. S. Price Oil Co. has sold four producing wells and about 4,700 acres of oil and gas leases in Runnels County, West Texas, to Barnes & Hill, Washington, D. C., and D. Henry Werblow, South Shaftsbury, Vt., for a reported $250,000.

Robert Rasmussen, Ballinger, will supervise development and operation of the properties for the new owners. Plans call for the immediate drilling of three new wells.



Petrofrac may be applied through tubing or down the casing. Wells have shown fast clean-up after treatment. Gel-breakers and shut-in time are not required. Almost all kinds of formations have been treated successfully.

PETROFRAC—NEW FRACTURING SERVICE BOOSTED PRODUCTION 696 BOPD

DOWELL fracturing method makes use of operator's lease crude oil . . . can be tailor-made to suit well conditions

Here's a new Dowell fracturing service designed to increase production from oil and gas wells. It's Petrofrac* —a treatment that uses graded sand and your own lease crude oil. The oil is thickened with a special chemical agent to give it enough body to suspend and carry the sand into the formation.

For proof of its effectiveness, look at this actual case history: An old well was plugged back and perforated opposite a sandstone formation. The well swabbed 24 BOPD. Then Petrofrac jumped production to 720 BOPD, flowing. After a period of flush production, this well leveled off at 300 BOPD, pumping and flowing.

Kerosene, diesel fuel or distillate may be used when lease crude is not available or suitable. As in other Dowell fracturing services, sand may be pumped into the formation in batches—a fine-grained sand followed by a coarse-grained sand.** This is designed to give larger fractures and better fluid drainage.

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Onassis Bids Revealed

Greek shipowner approaches Kuwait, Venezuela, and Iraq with tanker deals similar to unpopular Saudi Arabia pact

Dahl M. Duff

ACTIVITIES of A. S. Onassis, Greek-born shipowner, continue to cause alarm in the international oil trade.

Onassis has approached the shaikhdom of Kuwait with a tanker agreement similar to the one he has with the kingdom of Saudi Arabia. It also has been disclosed that he offered an agreement of this type to Venezuela some time ago, and according to reports, also to Iraq. Both countries turned him down.

In industry quarters, Onassis' deal with Saudi Arabia thus is viewed as a part of an over-all effort to tie up a sizable segment of the international oil business for his own ships. Some officials feel that if the Saudi Arabian agreement is not successfully resisted, the industry will be presented with similar arrangements in other countries.

Kuwait deal unlikely . . . It is not expected that Onassis will be able to conclude an agreement with Kuwait, even on a modified basis. Kuwait is a British protectorate, and in such matters, the shaikh is closely controlled by British representatives. However, rejection of the Onassis offer would be a talking point for favorable revisions in the oil concession contract.

Venezuela, Saudi Arabia, Kuwait, and Iraq are the four largest oil producing and exporting countries in the world. Venezuela has a highly responsible government insofar as petroleum affairs are concerned, and it looks on the companies as operating partners.

Opposition ready . . . The text of Onassis agreement with Saudi Arabia was published last week, and the disclosure of the full terms did little to quiet the storm that the deal has aroused. There are many indications that the industry is prepared, with the support of the U. S. and British governments, to stand firm against what is interpreted to be a violation of the terms of Arabian American Oil Co.'s concession.

Company officials stress that the significance of the Onassis agreement transcends the oil business. The matter raises grave questions of freedom of international trade and flag discrimination. One large international company is reported to have told Onassis it is canceling all tanker charters with him and that he can expect no more of its business in the future.

Sir Freerck Godber, chairman of Shell Transport & Trading Co., Ltd., said in London that he "most vigorously" endorsed the protests against what would seem to be "a flagrant instance of flag discrimination and a most serious breach of accepted international maritime practice. . ."

What he did . . . Essentially, what Onassis did was to negotiate an agreement with Saudi Arabia under which he agreed to organize a Saudi Arabian tanker company, provide a minimum of 500,000 tons deadweight, and pay the government about 3 cents a barrel in return for certain priority rights for shipping oil produced in Saudi Arabia.

The agreement allows tankers of the concessionaire companies to hold first priority provided they were engaged in the Saudi Arabian oil trade prior to December 31, 1953. In the original agreement, signed January 20, this first priority was given only to tankers owned by and registered in the name of the present companies. A later amendment offered by Onassis and accepted by the government changed this to broaden the preference to include concessionaire companies, parent companies, or of takers of petroleum and products.

The agreement also applies to Saudi Arabian oil even when shipped from pipeline terminals outside Saudi Arabia —an obvious reference to the Tapline terminus at Beirut and possibly also to Bahrein. Since the Tapline terminal is in Lebanon, the only way Saudi Arabia could enforce this would be to cut off its supply of oil.

The amendment specified that the rate to be charged by the Onassis ships would be equal to the London Tanker Brokers Board, provided it is not less than the average of the last or the quarterly rate assessment of the board. In any case, it appeared the rates to be charged by Onassis would be higher than the current going market.

It was said this alone makes the agreement unworkable, unless Saudi Arabia is prepared to give up a considerable amount of production.

Sharks Add Danger To Persian Gulf Search

These two divers are enclosed in a shark-proof cage as they descend into the waters of the Persian Gulf off the Trucial Coast shaikhdom of Abu Dhabi.

The work is a part of the exploration program of D'Arcy Exploration Co., Ltd. (Anglo-Iranian) in the offshore waters of the territory. The company is using a team of divers operating from the research vessel "Calypso" to examine the sea bed in waters of up to 250 ft. in depth and bring up specimens for checking by the staff geologist on board the ship. Commander J. Y. Cousteau, famous underwater explorer, who heads the team of divers, has been commissioned by the company to investigate the submerged areas.

Cuban Picture Hazy

More exploratory drilling needed to determine potential of Jatibonico discovery; source of production questioned

The following story was written for the Journal in Havana by O. B. Irizarry, publisher of Petroleo Interamericano, Latin American affiliate of The Oil and Gas Journal.

Oscar B. Irizarry

ADDITIONAL exploratory drilling will tell the true story of the Jatibonico wildcat completed May 1 in Central Cuba.

The big question is whether the oil is from source beds or is migrating up from a lower formation.

Interpretation of the geology is very difficult. The formation from which the well is producing consists of a fragmental clastic conglomerate of igneous origin in the Upper Cretaceous, which in this case is overlain with limestone of normal sedimentary Eocene character. No cores were taken of this horizon, but the formation appears to have medium porosity and permeability.

Well near oil seeps . . . Moreover, the well is located not far from an area of seepages. To the west is the old Jarrahueca field, where seeps are common and where the wells are producing from fractures in serpentine deposits found at shallow depths.

This circumstance, so prevalent in Cuba, injects considerable doubts in the minds of geologists who are trying to determine whether the oil is coming from source beds in the Cretaceous or from migration through fractures below the formations tested.

The well was drilled to 8,375 ft. The first 80 ft. the drill bored through Middle Oligocene deposits; from 80 to 150 ft. it went through beds indicating a transition to the Eocene; and from 150 to 1,100 ft. it bored through Eocene beds to contact with the Paleocene. Thereafter, the bit drilled through beds of sedimentary volcanic tuffs, or clastic material, intercalated with limestone beds. At 8,375 ft. the well was stopped without finding basement rock.

Three good oil shows . . . According to government geologists, as many as 32 horizons showed oil impregnations, but many oil men with experience in Cuba questioned the accuracy of these findings. It was decided to call an electric log specialist, Dr. R. G. Hamilton, Tulsa, to analyze the series of electric logs and recommend the zones to be tested. He recommended three intervals as potentially petroliferous: between 1,630-1,642 ft.; 1,304-1,320 ft.; and 1,072-1,130 ft.

All three of the zones were tested. The most promising was the interval between 1,072 ft. and 1,130 ft., at which level the hole was cemented and gun-perforated, and where production was obtained from the upper 16 ft., between 1,072 ft. and 1,088 ft.

The well came in with an initial production of around 250 bbl. daily of a muddy oil-water emulsion—about 75 per cent oil—and a well-head pressure estimated at 300 lbs.

The hole clogged frequently, causing the flow to decline to intermittent heads with low pressures, but by frequent swabbings production was restored. Finally 14 bbl. of gas oil were injected in the hole to clean the formation, and from that time on the well has been producing cleaner asphaltic-base oil at the rate of 50 to 100 bbl. daily. The gravity is between 15° and 17° A.P.I.

The well is located on a 29,000-acre concession owned by Compañía Refinería de Cabaiguán, S. A., of which Sixto Mesa Aromá is president, and Antonio Iglesias, manager. The block is surrounded by land controlled by the Cuban-Venezulean Oil Voting Trust, which acts as a holding company for 24 individual companies whose concessions are grouped in one unit for each of three separate areas. The exploration and exploitation expenses of the 24 companies are to be borne by Trans-Cuba Oil Co., a company organized by a group of Cubans prominent in sugar, banking, and industrial circles.

More drilling planned . . . Drilling was done with a National 75 rig owned by the Cuban Government and sold to Iglesias last year. The drilling crew and technicians were furnished by Kerr-McGee Oil Industries, Inc., Oklahoma City, under a labor contract. Two or three more wells will be drilled under the same arrangement to test the area fully.

Other firms interested . . . Because of the possibility that this well might lead to the discovery of sedimentary source beds in Cuba, several major oil companies and independent operators have sent observers to the island. Some groups are already negotiating for leases. One group of North Americans has joined a group of Cubans and organized the Cuban American Oil Co., which has announced an initial investment of $1,500,000 to start exploratory drilling within the next 90 days *(The Oil and Gas Journal, June 21, page 130).*

Optimism in Teheran . . . . . Compromise May Result

NEGOTIATIONS for settlement of the Iranian oil problem were resumed in Teheran last week in an air of optimism.

The delegation representing the eight-company international consortium returned to the Iranian capital from London with fresh instructions obtained in more than a month of discussions among officials of the companies involved.

It appeared the consortium's negotiators were ready to present a plan for a compromise solution of the management problem. It was on this point particularly that the first round of negotiations were broken off in mid-May.

New consortium head . . . Heading the consortium's delegation for the new series of talks is Howard W. Page, 48-year-old director of Standard Oil Co. (N.J.). Page, who was Jersey Standard's representative in London for 4 years prior to his return to the New York office last December, replaced Orville Harden, retired Jersey Standard vice president, as head of the consortium's negotiators. Harden's return to the United States was necessitated by ill health.

On his arrival in Teheran, Page said the new proposals would "square with" the Iranian nationalization law which calls for operation of the Anglo-Iranian Oil Co., Ltd., properties by Iranians. He did not elaborate.

The oil consortium, which is to take charge of marketing the production of a revived Iranian oil industry, requires some degree of control over operations in order to assure stable, nonpolitical management and safeguard the investment to be made. A probable solution is the establishment of a separate

Another new development using

B. F. Goodrich Chemical *raw materials*

The pump rod cups are made by The Dragon Manufacturing Company, Marietta, Ohio. B. F. Goodrich Chemical Company supplies only the Hycar rubber.

3 MONTHS' EXTRA WORK FROM OIL WELL PUMPS . . . with Hycar's help

OIL WELL operators are now extending the continuous operation of oil well pumps, getting higher well production and lower maintenance—thanks to new type pump rod cups made of Hycar American rubber and a phenolic resin.

The new cups are highly resistant to abrasion and are unaffected by oil, gas or other deteriorating elements commonly found in oil wells. They maintain a tight seal in the pump barrel long after other cups would fail—extend the continuous operation of the pumps by as much as 3 months. Result—wells are taken out of production much less frequently for cup replacement; higher well production and lower labor cost are gained.

Hycar rubber has many applications in the petroleum and other industries. And Hycar-phenolic compounds are used for many exceptionally "tough" jobs; they possess better resistance to shock, vibration and fatigue than ordinary rigid materials. Perhaps a part made from Hycar can help you solve a difficult problem—lead to improved operations. We'll help you with technical advice. For information, please write Dept. HJ-7, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

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agency or board fulfilling requirements of the Iranian law and, at the same time, satisfying commercial intersts of the companies. This management body would be responsible to the Iranian Government for some aspects of the industry, but it would give the consortium effective control over such matters as production, marketing, and personnel.

Other disputed points . . . There are several other points still in dispute. These must be settled before steps can be taken to revive a now virtually-idle industry which prior to its seizure 3 years ago by the Iranian Government produced up to 700,000 bbl. daily.

The level of production for which the consortium will undertake to provide market outlets is still not agreed on. What is expected is a gradually stepped-up output, perhaps largely limited to the normal growth in Eastern Hemisphere demand. An even more knotty problem is the Abadan refinery, the world's largest. Refinery expansion over the last 3 years, particularly in countries of consumption, has taken many of Abadan's former markets.

Iran has been insisting on the right to market a certain share of the production for its own account. The figure of 5 per cent has been mentioned in this respect. The Japanese Government recently began discussions with Iran on a trade agreement under which Iran would supply $15,000,000 worth of oil if negotiations with the consortium are successfully concluded.

As far as is known, there was no agreement on the compensation question before the negotiations adjourned in mid-May. At that time, discussions of compensation were taking place separately between British and Iranian representatives. They concerned losses to Anglo-Iranian over the last 3 years when it was deprived of the properties. Iran, on the other hand, had raised huge counter-claims against the company.

Government stronger . . . The Zahedi government appears to be in stronger position than at any time since it seized control last August. Some prominent leaders of the National Front have been released, and the curfew lifted in Teheran.

Aramco Operates New Line

Arabian American Oil Co. recently placed in operation a new 17-mile, 20 and 22-in. pipeline to deliver an additional 45,000 bbl. daily from Qatif to the Ras Tanura refinery and loading terminal.

The line is Aramco's third between the two points. Design, engineering, and construction was by Aramco personnel. Preliminary work began last October, and completion was far ahead of the originally-scheduled December date.

Part of the new line is buried and part is constructed on supports aboveground and above water. It includes a 2,300-ft. submarine section under Tarut Bay before reaching Ras Tanura.

A permanent pump station is under construction at Qatif, a junction point where lines from Abqaiq branch to Ras Tanura and to the trans-Arabian system to the eastern Mediterranean. Completion of the station this summer will further add to Aramco's pipeline capacity.

Production Record Broken

A new production record for the Middle East has been established by Arabian American Oil Co. with an average output of 1,026,791 bbl. daily in May.

Aramco is the second of the operating companies in the Middle East to top the million-barrel daily mark. Kuwait had a production of 1,012,200 bbl. daily in March, but fell back to 900,404 bbl. daily in June.

Previous high for Aramco's operations in Saudi Arabia was 978,300 bbl. daily in March. For the first 5 months of the year, Aramco's production averaged 967,658 bbl. daily. The refinery at Ras Tanura ran 245,498 bbl. daily in May and averaged 232,028 bbl. daily for the 5 months.

Brazil-U. S. Deal Denied

Rumors that Petrobras, the Brazilian state oil organization, is negotiating with United States interests for the development of Brazilian petroleum resources have been denied by Col. Jurassy Magalhaes, president of Petrobras.

Colonel Magalhaes pointed out that the Petrobras law prohibits such contracts. Foreigners can be employed for specific tasks, and at the present time, several U. S. companies are working under contract doing geophysical exploration, drilling wells, assisting in refinery construction, and giving general technical advice.

By the end of next year, Colonel Magalhaes said, refining capacity in Brazil is expected to total around 85,000 bbl. daily against only a few thousand barrels daily at present. This will mean a sizable saving in the approximately two-thirds of a million dollars daily Brazil now spends in foreign exchange for imported petroleum products.

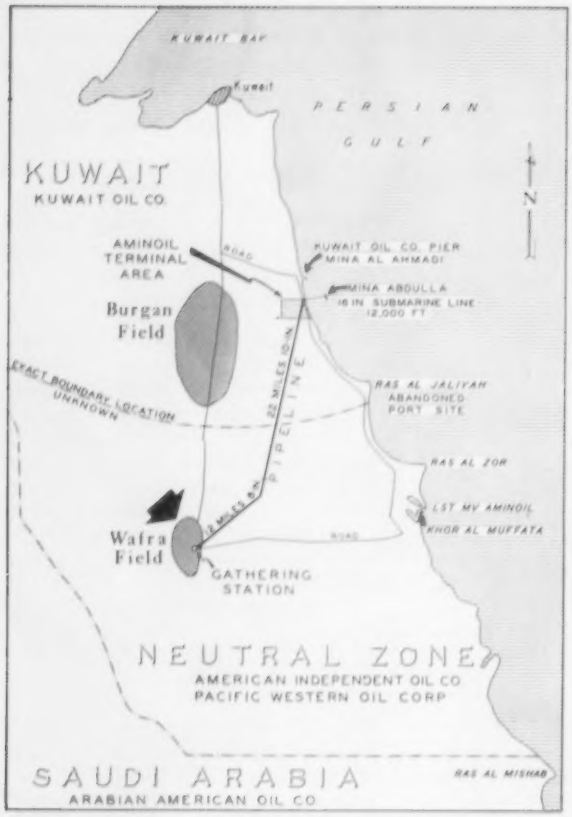
International Briefs

A 16,000-bbl. capacity steel barge for the transport of asphalt was launched recently at Port Deposit, Md., by Morania Oil Tanker Corp. The vessel is said to be the only asphalt carrier which can be used on inland waterways or in coastal service. The barge is 240 ft. long, with a 43-ft. beam and 15-ft. depth, and has eight times the asphalt-carrying capacity of barges now in use. It has double siding and bottom for reduction of heat loss. Its sponsor at the launching was Mrs. L. P. Street, wife of a vice president of American Bitumuls & Asphalt Co. (Standard Oil Co. of California.)

United British Oilfields of Trinidad, Ltd. (Royal Dutch-Shell) expects to place a new 30-mile crude line in operation in Trinidad in the near future. The line connects recent discoveries in the Ortoire Basin with Penal, where it joins an existing system supplying the company's refinery at Port Fortin. U.B.O.T. also has recently started drilling deviated wells from the shore in the Point Fortin area in a program carried on in behalf of Trinidad Northern Areas, Ltd.

British Petroleum Chemicals, Ltd., has announced plans to build a new plant at Grangemouth, Scotland, to produce alkylate for use in the manufacture of high-grade detergents. The plant will draw part of its feed stock from the adjacent refinery of Grangemouth Petroleum Refinery, Ltd. (Anglo-Iranian Oil Co., Ltd.). It is expected to come into operation the latter part of next year. British Petroleum Chemicals, Ltd., is jointly owned by Anglo-Iranian and The Distillers Co., Ltd.

The slump in the tanker chartering business is emphasized in a recent report issued by the Charles R. Weber Co., New York tanker broker firm. In the last 2 months, 95 more tankers have been forced into lay-up because of the newer and more efficient ships available on the market. Altogether, 236 deep-sea tankers, or nearly 10 per cent of all tankers afloat, have been idled. Most of these ships are independently owned vessels which normally handle 15 to 20 per cent of the traffic in addition to that carried by the fleets owned by the oil companies.



WAFRA'S PIPELINE, 34 miles long, was completed in less than 10 months.

LAST LINK in the pipeline is this sea end on beach with pulling sled.

Neutral Zone's New Oil

Wafra's Drilling, Development, And Shipping System

DISCOVERY WELL of Wafra field is one of seven now producing at a rate of 1,500 to 5,000 bbl. per well. Production followed 4 years of exploration.

CLIMAXING 4 years of exploration work, the first oil from the Kuwait-Saudi Arabia Neutral Zone was shipped to Japan in early January 1954.

Wafra field is the first commercial structure discovered in the Neutral Zone, a territory of about 2,500 sq. miles lying on the Persian Gulf between Saudi Arabia and Kuwait. This field is centrally located in the zone about 20 miles south of Kuwait Oil Co.'s Burgan field and 30 miles inland from the gulf. The field has seven producing wells; daily production in January ranged from 1,500 to 5,000 bbl. per well.

The 34-mile pipeline system, termed the Wafra Shipping System, was completed under remote desert conditions in less than 10 months after the discovery well was brought in. This probably established a record for moving oil from a foreign field into the world markets.

Concession held by Aminoil and Pacific Western Oil Corp. . . . Aminoil is the holder of a concession from the State of Kuwait covering its undivided 50 per cent interest. Aminoil has carried on the exploratory and development work for itself and also in behalf of Pacific Western Oil Corp. which holds a concession from Saudi Arabia on the other undivided one-half interest. Expenses of exploration and development are shared by the two operating companies and all oil produced is divided between them. Gathering and shipping facilities are owned by Aminoil, and an arrangement has been made with Pacific Western to handle its share of the oil.

Exploration . . . Exploration was commenced in 1949 with a gravity-meter survey and on the basis of the results of this survey, the first well was spudded on December 11, 1949. By January 1951, this and three addi-

tional exploratory wells had been drilled and abandoned as dry holes. During the year 1950, when it became apparent that more geophysical work should be done in the area, a comprehensive seismic survey was initiated and carried on into early 1952. Structure-hole drilling completed the exploratory work. In March 1952, a fifth wildcat was drilled near the coast in the southern part of the zone, but was abandoned as dry.

Wafra No. 4, the discovery well, was spudded February 10, 1953, and brought in on March 17, 1953. Drilling has been continuous since that time.

The initial drilling was done with a U-15 rig and in January 1954, a U-35 was put in service. The casing program is 20 in. at 200 ft., 13⅜ in. at 550 ft., 9⅝ in. at 3,400 ft., and 7 in. at 3,850 ft. The 7-in. casing is cemented through the productive section and gun perforated. Production is through 3-in. tubing.

Geology . . . The pay section is approximately 200 ft. thick and consists of loosely consolidated, highly permeable sandstone. To date no trouble has been encountered from sand while flowing the wells. The producing section is Middle Cretaceous in age and is equivalent to the First sand of Burgan field. Based upon data so far obtained, Wafra field appears to lie on a domal structure some 7 miles long by 3 miles wide. The limits of the field have not actually been determined by drilling. The wells have been drilled on a square 1-mile spacing pattern but this spacing will probably be broken down later.

Production . . . During January 1954, the individual wells were produced at rates varying from 1,500 to over 6,000 bbl. per day. These rates, however, are not necessarily indicative of the rates at which production from wells will continue. The crude produced runs about 24° A.P.I. and has a viscosity of S.s.U. at 70° F.

FLOW-LINE MANIFOLD backed by a 5,000-bbl. test tank to the right and a 10,000-bbl. production tank on the left.

Urgent need for pipeline system . . . Upon completion of the discovery well, Aminoil took immediate action to install gathering and shipping facilities. With the emphasis upon providing a working facility in the shortest possible time, it became apparent that the system would have to be improvised from materials and equipment which were immediately available.

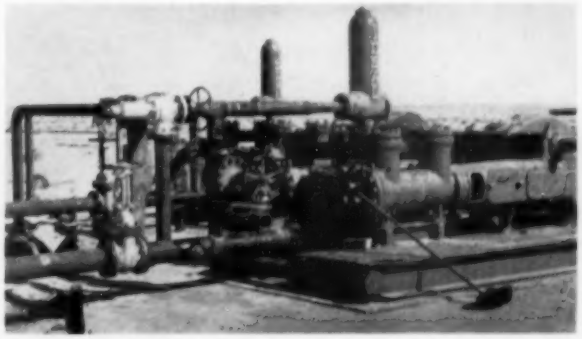
After preliminary studies were completed, an engineering reconnaissance of the Neutral Zone and Kuwait was made to inspect possible terminal sites, pipeline routes, and other matters pertinent to the design and construction of a shipping system. In order to save valuable time after plans and specifications were complete, interested Middle East contractors were interviewed and the probable sites and routes were traversed with them at the time the reconnaissance was made.

Contracting & Trading Co., with head offices in Beirut, was selected as the contractor. On tank and pipe work CAT, as it is usually called, is affiliated with the Motherwell Bridge & Engineering Co., Ltd. Construction began about the first of August when the contractor established a tent camp in the Wafra area for his personnel. The contractor's personnel consisted of Lebanese mechanics and Arabs of local origin. Although the contractor handled the major part of the construction, a substantial amount of work was done by Aminoil personnel and equipment.

Design capacity . . . The design objective was to produce a simple, workable system capable of 20,000 bbl. per day which could be readily constructed from available materials, and which could be easily expanded.

The pipeline consists of about 12 miles of 8-in. line and 22 miles of 10-in. line. The line pipe was surplus pipe of various specifications purchased from Aramco, and was moved by barge

CONSTRUCTION SUPERVISORS of the Wafra line were (left to right): George Clark and S. F. Douglass of Aminoil, and Abu Salim and John Agar of CAT.



DESERT PUMPING INSTALLATIONS like this combine Ideal C-150B slush pumps with GMC 6-71 engines.

from Saudi Arabia. The pipe is laid on the ground in wide snaking bends and will be placed on supports later. It was construted with one spread using the stovepipe method. Progress was about 3,000 ft. per day on 10-in. using one stringer bead man and five production welders.

Terminal . . . The marine terminal is located in the State of Kuwait about 3 miles south of the Kuwait Oil Co. pier. The land area is a sandy plain which slopes toward the gulf and is of sufficient size to accommodate future terminal expansion and refining facilities. The terminal is named Mina Abdulla in honor of His Highness Shaikh Sir Abdulla al Salim al Subah, ruler of Kuwait.

Tankage at the terminal consists of two cone-roof tanks of about 73,000 bbl. working capacity each. The long delivery time on new tanks made it necessary to purchase used tanks for the job. These were riveted tanks which were dismantled in Wichita, Kans., and reerected at the terminal site.

A small temporary camp is under construction at the terminal for the operating personnel to supplement the base camp operation at Khor at Muffata, some 30 miles down the coast, where a converted LST is used for accommodations.

Submarine line . . . There is a 16-in. submarine line 12,000 ft. long to a sea berth. The launching of this line was, perhaps, the most difficult part of the construction job. The decision was made to pull the line submerged due to the difficulty of keeping such a long floating line in alignment.

In order to secure a negative buoyancy sufficient to sink the line, but not enough to cause excessive drag, a plan was devised to place an 8-in. line inside the 16-in. The combination of the 16 by 0.312-in. pipe filled with air and the 8 by 0.277-in. wall pipe filled with water provided a net weight of 9.3 lb. per foot submerged.

Welded in Two Lengths

The line was welded up in two 6,000-ft. lengths, with the 8-in. being welded inside concurrently with the 16-in. The two lengths were laid parallel to an industrial railroad track, and each length was lifted to dollies by sideboom tractors. Two 1,250-hp. tugs were chartered from Kuwait Oil Co. and lashed together to make the pull.

After the first section was pulled, a tiein weld was made on both the 8 and 16-in. lines and the final pull was made to position. The 16-in. line was flooded by a diver opening a 6-in. valve on the sea end. Subsequently the water was displaced from the 8-in. line by compressed air and the line was withdrawn by two tractors.

The line was launched without coating, but cathodic protection will be provided in the near future.

Sea berth . . . Tankers are moored at the sea berth by two 45-ft. diesel tugs. There is 43 ft. of water at the berth at low tide. Moorings consist of ship's anchors forward, and anchored buoys with pelican hooks for the aft line and two quarter lines. Communication is provided by VHF radio telephone between the terminal office, the loading tanker, and the tugs.

Unusual aspects . . . The desirability of an early completion date made it necessary to plan the job somewhat differently from what might have been done under other circumstances. The use of surplus pipe available in the area and used storage tanks has already been mentioned.

The short construction schedule also made it expedient to start pipeline work before complete data were available on the port area. Based on published hydrographic charts, a terminal site and port area had been selected at Ras al Jaliyah, just north of the boundary between Kuwait and the Neutral Zone, and construction of the pipeline was started toward this point. Concurrently with the pipeline work, a detailed hydrographic survey was carried on at Ras al Jaliyah to determine the best location for the submarine line and the sea berth.

Ten miles of the pipeline had been completed on the bearing to Ras al Jaliyah when the hydrographic survey disclosed uncharted obstacles in the port approaches which made it impracticable to use it as a terminal area.

Pipelining was temporarily stopped and crews put to double ending pipe. After further hydrographic work had established that an area about 13 miles up the coast from Jaliyah was satisfactory, and arrangements were made for a terminal at that location, pipeline construction was resumed on the new bearing.

Personnel . . . Aminoil's field operations are in charge of James MacPherson, resident vice president and general manager, Kuwait, and Bryan Denson, Neutral Zone superintendent.

Supervision of the construction project for the company was the responsibility of S. F. Douglass, who was assisted by George Clark, welding inspector, and John Gasperetti, surveyor. Jack Shotton was in charge of marine work.

Jawad Farouki and Nicholas Halaby, of CAT's Beirut office, were in overall charge of the contractor's operations. Faiz Bustani was resident engineer and John Agar was general superintendent.

The project was engineered by Carroll E. Bradberry and Associates, consulting engineers of Los Altos, Calif.; Capt. J. A. Rumsey was the marine consultant.

PREPARING to launch the submarine line, tugs stand by at Mina Abdulla as pipeline-construction crews work up to the shoreline.

Better Results With Fewer Men

. . . that's the story of General Petroleum and its efforts to control refinery maintenance costs through minimizing the number of maintenance employes on weekly payroll

by F. C. King

A PROGRAM was initiated at the close of World War II in General Petroleum Corp.'s refinery at Torrance, Calif., to control maintenance costs, mainly through minimizing the number of maintenance employes on the payroll.

The Torrance refinery is located in the Los Angeles metropolitan area. Crude-oil throughput averages approximately 110,000 bbl. per day. The plant covers 900 acres. A variety of crude oils are delivered to the refinery via pipeline. Some products are loaded into trucks and tank cars at the refinery, but the majority are shipped via pipeline to other loading terminals.

Processing facilities mainly consist of three crude-oil units, four T.C.C. units, and facilities for thermal viscosity breaking, reforming and coking, HF alkylation, catalytic polymerization, ammonium sulfate, light-ends recovery, sulfur dioxide extraction, and gasoline treating. There is no lubricating-oil processing. Total personnel at the refinery numbers slightly more than 1,000.

The increased effectiveness of the maintenance organization from 1945 to 1953 is indicated in Fig. 1. The reduction in maintenance personnel which has occurred in this same period, during which time plant facilities continually were being expanded, is shown in Fig. 2.

Author is associated with General Petroleum Corp., Torrance, Calif. Summary of paper presented at annual A.P.I. mid-year meeting, division of refining, Houston, 1954.

Minimum Size of Crew

Labor costs are the largest single factor in maintenance expense. Over a period of 15 years the percentage of maintenance expense represented by direct labor usually has been between 40 and 50 per cent. During the past 5-year period the variation in this percentage has been between 41 and 44 per cent. From this it appeared that close control of maintenance labor costs automatically would control total maintenance expense.

Within certain limits labor costs depend on one thing, and one thing only; i.e., the number of men on the payroll. The approach which we took was to settle on the minimum size of crew with which we felt we could maintain our plant satisfactorily, to reduce the crew to this number, and then to hold it there.

The peak manpower demands which determined this minimum basic crew at the time consisted of 16 weeks per year of major unit turnaround. For a definite starting point it was decided that the crew should be sized so that it could handle a major viscosity-breaker unit turnaround in 5 days, plus the minimum of necessary running and standby maintenance work at the same time.

It also was recognized that requirements for certain crafts, such as painters, were independent of shutdown work and must be determined by the total work load. The manpower analysis, which was made individually for each craft, may be summarized as follows:

Number of men required to complete a viscosity-breaker shutdown in 5 days	247
Number of men required for other maintenance work during a viscosity-breaker shutdown	132
Number of men not determined by shutdown workload requirements	58
	437
Allowance for nonproductive time (vacations, sick leave, etc.)	41
Total number of men required for maintenance work	478

The total of men arrived at in this manner was actually approximately 100 fewer than were on the payroll at the time the analysis was made. Aside from one minor layoff in one craft the force

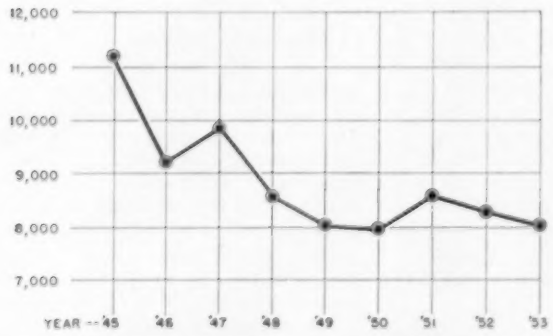


Fig. 1—Man-hours of maintenance per million dollars of plant-replacement value in 1953 dollars.

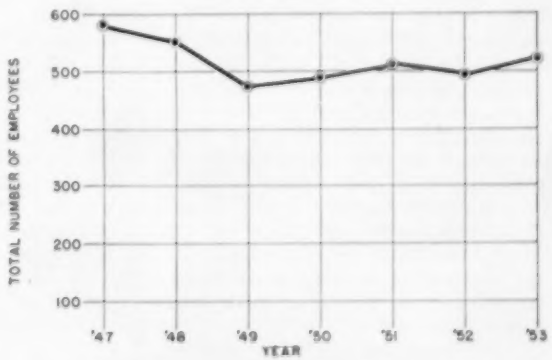


Fig. 2—Total number of maintenance employes.

was permitted to seek its own level by not hiring and by allowing normal attrition to take care of the reduction over a period of time.

Standby work . . . One of the most fertile fields explored in the attempt to reduce the peak load during shutdowns was a close examination of jobs which fall in the standby category. Unless carefully controlled, it is very easy to get into a state of mind in which a number of maintenance people are kept around the clock to take care of emergencies just in case something happens. There is a general tendency for maintenance personnel gradually to take over routine tasks which should more logically be performed by the operators.

For example, at one time it was considered necessary to have maintenance personnel regularly make the rounds in certain areas to check bearings for overheating, to fill oil cups, and to perform general lubrication of mechanical and electrical equipment. Another example was the daily check made of the storage batteries used in our electrical switch houses on our 24-volt direct-current starting system. This was done every day, and it occupied the full time of two electricians.

It was established definitely that lubrication was a function to be performed by operating personnel regularly on shift, and not by maintenance personnel. An educational program was launched, and a system was established so that there could be no misunderstanding as to the use of the proper lubricant in the proper place at the proper time interval. At the same time, facilities for handling, storing, and dispensing lubricating oil also were improved. As a result, bearing-failure frequency did not rise as some people thought it would, but actually dropped after the program became firmly established.

Job-order system . . . In setting up the job-order system for the new plan, the basic principle followed was to assign authority for approving work to an individual close enough to the problem to exercise the proper judgment and to make the proper decision. This person is the refinery engineer. He is in the operating department and is held responsible for the over-all technical supervision of a unit or group of units. This individual has the authority to approve or disapprove all requests for job orders. He also is held responsible by his management for keeping the maintenance costs on his unit or units within the proper limits.

Any maintenance job which requires more than 4 hours for one mechanic and a helper must be authorized by a separate job order. Anyone can originate a request for a job order, but it must be approved by a refinery engineer who is responsible for the area under question.

The job-order system replaced a haphazard system of memoranda and verbal instructions from a multiplicity of operating and maintenance people as to what maintenance work is to be done. Under this system instructions are channeled properly. The maintenance supervisor does not receive conflicting directions from different people. The fact that the order must be approved before it is issued means that the person who approves the order is going to assure himself that the proper people have been consulted and that the proper diagnosis of the problem has been given.

Because copies of all job orders are distributed to operating supervisors as well as to maintenance supervisors, it assures that operating people are cognizant of maintenance work which is under way in the various areas.

The job order provides a means to collect and report all labor and material charges for each job, and it serves as a permanent cost record. After the job has been completed, it must be signed off by the stillman in charge of the unit concerned.

Shutdowns . . . Control of turnaround work is effected by the use of a work outline. This work outline lists all work to be done by item in the proper category. It must be approved by the refinery engineer before it is issued. Additional jobs which turn up during the course of the shutdown are covered by a separate shutdown work order written on the job by the inspection engineer, who must clear all major items with the refinery engineer.

All work which is performed according to the work outline or shutdown work order must be signed off first as okay to close, then as okay to operate, by the inspection engineer, the assistant maintenance superintendent, and the unit stillman. Following the shutdown an inspection report is written by the inspection engineer which summarizes the work done during the shutdown, and which lists recommendations for spare parts or work to be done on some future shutdown.

Overtime . . . The use of overtime is very easily abused and must be carefully controlled. One cause of overtime which we consider legitimate is emergencies which occur at night, or over the week ends, in which immediate action is necessary to prevent a prolonged offstream period of a major unit. Another is an abnormal work load on a shutdown, in which case the offstream time saved by working overtime will more than justify the additional cost of the overtime.

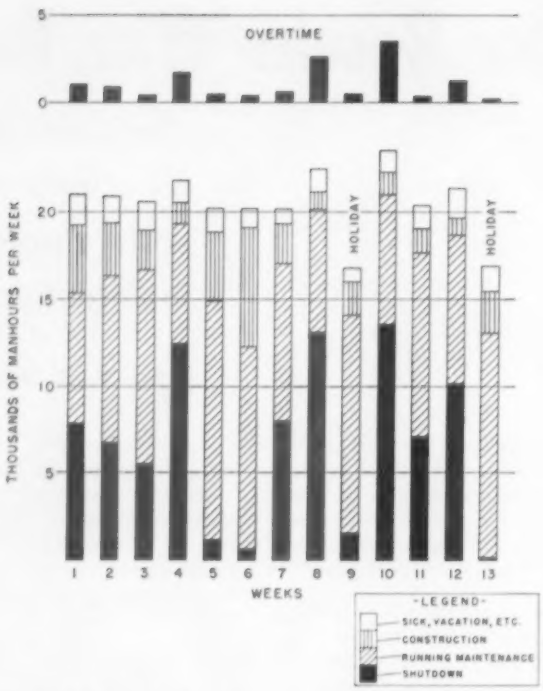


Fig. 3—Distribution of maintenance man-hours by week, fourth-quarter 1953.

All overtime is approved by the refinery engineer for the unit in question before it is worked. A report is made weekly which shows the amount of overtime worked, the job, and the person authorizing it. This report is circulated to department managers and to the director of the department.

Maintenance-expense report . . . To further the development of a feeling of cost consciousness a monthly report of maintenance expenses is issued. Some 40 copies of this report are distributed to operating supervisors, refinery engineers, unit stillmen, and maintenance supervisors. These reports give the monthly maintenance expense—broken down into labor, burden, material, and hauling—for each unit or facility.

Comparisons are made between the expense, for the month under consideration, previous months, and yearly averages. Significant deviations are explained. The report also includes a listing of all individual job orders which were completed within the month, with cost breakdown for each.

Several benefits from the circulation of this report have been noticed. Management is kept informed and can judge the effectiveness of the control being exercised. The refinery engineers who are responsible for control have an accounting made to them. Individual jobs, whose costs appear to be out of line, can be flagged and analyzed for improved procedures in the future.

Maintenance Planning

The minimum crew was set up on the basis of one major unit turnaround. If two units happen to be down at the same time, it follows that there will be excessive down time for one or both units. To avoid this sort of thing, and also to obtain other advantages, a unit shutdown schedule was devised.

The units are scheduled to run as long as possible on the basis of past records and still reasonably avoid the possibility of emergency shutdowns. Also the schedule is so arranged that so far as possible there is at least 1 week without shutdown work between all major-unit turnarounds. This permits the maintenance crew to catch up on the backlog of running maintenance work which accumulates during weeks of major shutdown.

The shutdown schedule is prepared approximately 3 months before the end of the year for the coming year. It is revised quarterly or more often if conditions dictate. The shutdown work load purposely is made light for the third quarter for two reasons: (1) it is the most desirable time for vacations; and (2 the summer gasoline demand dictates that it is most desirable to keep most of the units in operation at this time. The schedule also is used in the preparation of the product supply statements. It serves as a guide to determine when repair and replacement parts will be needed, and also when alterations and other items of new work should be ready for tying in.

After it has been determined when a turnaround will occur, the next question which must be answered is what work is to be done. Two to three weeks before a unit is to be shut down, a work outline is prepared on which all work to be performed is listed under suitable headings. This is done by the inspection engineer, who obtains his information from numerous sources. At this stage careful investigation of work requests often eliminates unnecessary items.

The rough draft of the work outline then must be checked and approved by the refinery engineer responsible for the unit. As soon as the final work outline has been issued, and it is known which items of equipment will be worked on, a detailed shutdown procedure for the stillmen to follow in shutting down, blinding off, and vapor-freezing the unit is prepared by the refinery engineer.

These shutdown procedures carefully are worked out with the thought of releasing the various items of equipmen for gas-freeing and opening as quickly and as safely as possible. The use of these procedures considerably has reduced unit down time.

Preshutdown meetings . . . The large number of different crafts and other parties involved in the unit shutdown makes it desirable to outline the work to all at one time rather than to discuss one part with each one separately. To provide an opportunity to acquaint the key foremen and other parties concerned with the work to be done, a meeting is held prior to scheduled major shutdowns.

At this meeting the work to be accomplished is reviewed, questions are answered, and agreement is reached on many possible differences which might otherwise arise while the work is in progress. These meetings, which ordinarily last from 1 to 2 hours, greatly improve the coordination of the work and result in much smoother performance on the job.

Shutdown work orders . . . As additional items of work occur during the shutdown the inspection engineer writes shutdown work orders in the portable shutdown office. No work which is not itemized on the work outline is done without a separately written shutdown work order. Thus, when the unit goes back on stream, the work outline plus the shutdown work orders are a complete list of everything which was done. Channeling of all instructions in this manner relieves the maintenance supervisors of the difficult task of trying to please a number of different operating and technical people.

Shutdown supervision . . . All work on a given turnaround is under the direction of an assistant maintenance superintendent. Major shutdown work is conducted on a three-shift basis. The crew assigned to a shutdown normally is split so that one-half of the men work on the daylight shift, one-quarter work on the afternoon shift, and one-quarter work on the graveyard shift.

There is an assistant maintenance superintendent in charge of each shift. However, the assistant maintenance superintendent in charge of the daylight shift is responsible for the over-all planning of the work. He is in charge of all craft supervisors who are connected with the turnaround. He is responsible for completing the job within the scheduled time.

Running maintenance . . . Operating with a minimum basic crew also means operating with a backlog of running maintenance work. Thus the work always is pushing the men. However, some jobs are more important than others, and it is essential to have a means of flagging truly urgent jobs and also of separating the more important from the less important work. In order to do this a priority system was instigated which would retain flexibility for handling emergencies and still serve to get first things done first. The basis of this priority system is a priority list which is issued each week when there is not a major turnaround.

The refinery is divided into four areas, and for each area anywhere from 10 to 30 separate jobs will be listed in order of descending priority. The list is prepared by the maintenance-control engineer in conjunction with the inspection engineers. It is discussed at a meeting held on Friday morning for the following week. This meeting is presided over by the refinery manager, and is attended by the refinery engineers, the inspection engineers, the maintenance superintendent, and the maintenance-control engineer.

Because the priority list is issued a week in advance, some means are necessary for determining and channeling requests for urgent and emergency jobs which arise after the list has been issued. Anything of this nature which comes up during the day is referred to the maintenance control engineer who may check with the refinery engineers or the refinery manager to determine

the urgency of the job. From this information he prepares a so-called daily "hot sheet" at the end of each day for the following day.

Also, at 6 o'clock each morning the night refinery superintendent contacts stillmen at all units for any emergency items of work which have come up during the night. These two lists are discussed between the maintenance control engineer and the refinery operating superintendent prior to 8 o'clock each morning. Jobs which carry priority are indicated with red pencil, and the lists are turned over to the maintenance superintendent.

During weeks when there is no major turnaround, most of the men work on the daylight shift. Each of the four areas into which the refinery is divided is in charge of an assistant maintenance superintendent. It is his responsibility to organize and coordinate the work in his area according to the job-priority list and the daily hot sheet, as he is instructed at the morning maintenance meeting.

This meeting is held each day at 8:30 a.m. It is conducted by the maintenance superintendent. It is attended by the assistant maintenance superintendents, the general-shops foreman, the machine-shop superintendent, the chief meterman, the carpenter and paint-shop superintendent, the chief electrician, and the maintenance-control engineer. Status of jobs on the weekly priority sheet is reviewed by each assistant maintenance superintendent for his area. Urgent and emergency jobs which originate from the morning hot sheet are discussed and are taken care of. Items which require coordination among the crafts and different shops are discussed pertaining to each job. This meeting normally lasts one-half hour.

Minor construction work . . . In addition to the shutdown and running maintenance work 15 per cent of the available manpower over any 1-year period goes into construction projects. The crew is based on peak loads, and thus more than the maintenance backlog is required to fill in the valleys. Minor new construction work is used whenever the type of work is adaptable, and whenever material deliveries and required completion dates for the different jobs fit in with the shutdown schedule and maintenance work requirements.

A current man-hour backlog for each construction job is reported semi-monthly. Using this figure and the priority requirements of the job in question, as well as the material delivery report (which indicates when the material will be available), it is possible to schedule construction-job completions and to determine which should be contracted.

Fig. 3 shows the distribution of man-hours by week for the fourth quarter of 1953. Variations in construction work from week to week readily are apparent.

Proper Organization

The program which has been outlined was designed to bring operating and maintenance supervisors together on a common basis. Plant operating personnel are included within the area of decision on maintenance problems. It is they who decide which work is to be done, and which should be done first.

The maintenance personnel determine how to do the job, who is to do it, and how many people are required. It also was recognized that many of the decisions could not best be made in the front office. Field supervisors are charged with responsibility and are given the authority for carrying out their decisions.

The program was designed to develop good employe morale. Operation with a fixed minimum crew, which results in steady employment and job security, is an advantage which should not be passed over lightly. Upgrading and promotions from within have been resorted to in order to fill all vacancies.

This has required the training of our own mechanics. For this purpose there has not been developed any formal training school or system, but temporary setups and on-the-job training have made it possible to fill vacancies without hiring a single mechanic, as such, at the gate in the past 8 years.

Maintenance organization . . . A good maintenance organization is one in which duties and functions clearly are understood, and lines of responsibility clearly are drawn with a minimum of overlapping; one in which staff and line functions properly are segregated; and one in which responsibility and the necessary authority go hand in hand.

To clarify the position of some of the jobs mentioned in the report, Fig. 4 shows an abbreviated organization chart for the engineering and refining departments. The functions of four of these key positons are as follows:

1. General maintenance superintendent is the line supervisor in charge of the maintenance crew. He supervises the shop superintendents, the assistant maintenance superintendents, and the coordinator. He conducts the morning maintenance meeting, and is responsible for the over-all functioning of the department as a whole.

2. The assistant maintenance superintendents are the key executive officers who are in charge of expediting and executing the work in their respective areas. They are responsible for keeping their manpower requirements in balance with their work load and for coordinating the different crafts involved in the work within their area. When the crew is on shift work for a major shutdown, three assistant maintenance superintendents are required—one for each shift on the shutdown. During this time the work other than the shutdown is handled by one assistant maintenance superintendent.

3. The coordinator is the switchboard through which requests for work, equipment, movements of men, material, and similar items channel. He maintains two-way radio contact with all key field personnel. His staff keeps the material section informed of any requirements for special material or outside services. His staff also serves as a contact point for channeling questions regarding engineering and design.

4. The maintenance-control engineer is in charge of equipment inspection and records. He also serves as a contact man between the operating and maintenance groups for establishment of job priorities. He is responsible for the preparation of the weekly priority list, and also for the preparation of the shutdown work outlines.

Fig. 4—Outline of plant organization.

SPECIAL MOBILE EQUIPMENT used in Stratafrac operations features power-driven paddle-mixer tanks and high-volume, high-pressure triplex pumps.

Fracturing Boosts Production In Southwest Texas

by J. F. Bozeman and J. P. Moran

THE successful application of Stratafrac to the soft, friable, and shaly formations of Southwest Texas has disproved the belief that hydraulic formation fracturing was applicable only to dense, hard sandstones or conglomerates, both of which are relatively free of shales. Applied to hundreds of these wells in the past 2 years, this hydraulic - fracturing method has provided sustained commercial increases in oil and gas production in more than 80 per cent of the wells treated.

Lithology of the producing formations in this area of Eocene and Oligocene age can be described generally as formations that are interbedded with shales and sandy shales. The hardness or strength of these formations is a function of depth and degree of compaction rather than any inherent properties of the formations themselves.

Authors are sales engineer and district engineer, respectively, for Dowell Incorporated, Houston.

Many of the formations are considered soft in the usual sense of the word. In other established formation-fracturing areas, these formations and many of the types of wells that have responded favorably to Stratafrac in Southwest Texas would have been considered poor risks.

Specifically, the formations that have been successfully fractured are the Wilcox, Cook Mountain, and Yegua of Eocene age and the Vicksburg, Frio, and Catahoula of Oligocene age. Results of Stratafrac treatments of Cretaceous formations in Southwest Texas have been previously discussed by McCaslin.[1]

Stratafrac is a mechanical-chemical well-stimulation process of hydraulic formation fracturing. In this process a previously prepared, viscous, sand-laden fluid is introduced into a hydraulically created fracture in the producing formation. There the viscous-carrying fluid returns to its nonviscous components, depositing the sand. The sand in the fracture acts as a propping agent to maintain the newly established increased drainage area.

The viscous fluid used is called Jel X 500. This material consists of a hydrochloric acid-kerosine gel, mixed to a controlled viscosity and possessing a high-viscosity index. These viscosity characteristics make the gel easy to pump yet suitable for carrying large quantities of sand into the formations of wells with bottom-hole temperatures as high as 350° F.

The viscosity - temperature properties of Jel X 500 are important in Southwest Texas where high geothermal gradients and relatively deep wells thin some fracturing fluids to the degree that they lose their viscosity and ability to fracture, as well as their sand-carrying properties. Fig. 1 shows the difference in the viscosity index be-

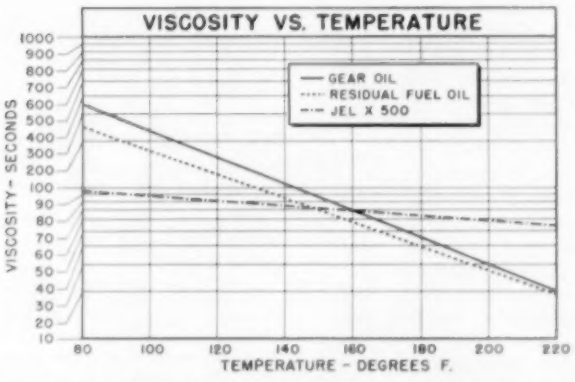


Fig. 1—Viscosity and sand-carrying characteristics of the acid-kerosine gel are not seriously affected by high bottom-hole pressures.

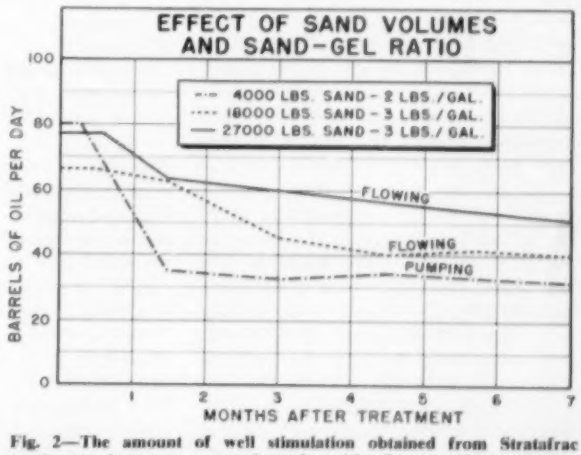


Fig. 2—The amount of well stimulation obtained from Stratafrac treatments increases proportionately with the poundage of sand injected.

TABLE 1—STRATAFRAC RESULTS—OIL AND GAS WELLS—SOUTHWEST TEXAS

County—Formation—	Depth, ft.	Jel X 500 (gallons)	Sand, ft.	Production, bbl. oil per day			Mo. after treatment
				Before	After	Production	
Brooks—Frio	6,020	2,000	4,000	8 gas lift	25 gas lift	21 gas lift	6
Duval—Hockley	4,560	2,000	4,000	11 pump	120 pump	85 pump	5
Duval—Pettus	3,600	3,000	6,000	10 pump	29 pump	27 pump	4
Hidalgo—Frio	6,070	3,000	6,000	Swabbed to bottom	120 flow on 7/64-in.	108 B.O.P.D.	4
Live Oak—Hockley	1,000	1,000	4,000	5 pump	22 pump	17 pump	7
Kleberg—Catahoula	2,900	2,000	6,000	0 pump	40 B.O.P.D.	35 pump	3
Jim Wells—Frio	5,100	3,000	5,000	0	104 B.O.P.D. pump	65 flow	9
Jim Wells—Vicksburg	5,300	2,000	3,000	40 initial 10 flow	80 flow	65 flow	10
Nueces—Frio	7,925	2,000	6,000	60 flow	166 flow	145 flow	4
Nueces—Frio	7,950	3,000	4,500	50 flow	175 flow	145 flow	5
Starr—Frio	2,850	2,000	4,000	10 pump	65 flow 5/64-in.	65 flow	5
Starr—Frio	1,420	2,000	6,000	2 pump	70 pump	50 pump	3
Willacy—Frio	7,850	2,000	4,000	13 gas lift	37 gas lift	37 gas lift	1
Zapata—Crockett	3,020	2,000	6,000	No test	262 flow ¼-in. choke	85 flow ⅛-in. choke	8
Jim Hogg—Yegua	3,660	3,000	4,000	3 pump	30 pump	25 pump	10
Jim Hogg—O'Hern	2,330	2,000	4,000	13 pump	27 flow	22 flow	2
Nueces—Frio	5,810	3,000	6,000	38 ft. O.C.M. D.S.T.	110 flow	100 flow	3
Live Oak—Pettus	3,780	2,000	6,000	1,800 ft. fillup in 8 hr.	31 pump	28 pump	3
Live Oak—Hockley	1,000	1,000	5,000	6 pump	14 pump	9 pump	8
Live Oak—Vicksburg	3,750	2,000	6,000	30 pump	60 pump	53 pump	2

tween semirefined viscous oils and Jel X 500.

Jel X 500 is a stable mixture at atmospheric temperatures. It can be premixed and stored at service-company stations in readiness for well treatments. The propping sand is added to the gel in suitable ratios to meet specific well conditions prior to its movement from loading points to the well locations.

After being pumped into the formation, the breaker agents in the gel react with the formation to cause the X 500 to return to its acid and kerosine components. The self-liquidation of the gel insures its removal from the well and eliminates the need of extensive well shutin time following treatment. The free acid and kerosine from the broken gel act as cleansing agents for the soluble materials on the walls of the fracture, and give added permeability increases to the adjacent formation.

The propping sand consists of washed and closely graded oval or subangular silica sand. The permeability of this sand will vary between 42 and 1,735 darcies depending on the mesh size and particle shape used. The contrast between the propping sand permeability measured in darcies and the usual formation permeability measured in millidarcies shows that little flow resistance is encountered by the oil being produced through the artificially created drainage area into the well bore.

A specially designed gel transport is used in Stratafrac treatments to carry the gel and sand mixtures from storage points to the well. The transport is a semitrailer truck on which a 3,000-gal. cylindrical tank is mounted horizontally. A motor-driven mixing paddle, running lengthwise through the tank, is used for stirring the mixture immediately before introducing it into the well. This uniform mixture of gel and sand is then pumped into the formation by means of high-pressure triplex pumps at rates of from 2 to 5 bbl. per minute.

Procedure used to fracture a well in Southwest Texas is, first, to fill the tubing and break down the formation with 10 to 20 bbl. of crude oil, or until the injection pressure remains constant. In new wells or those that exhibit high breakdown pressures, the use of 250 to 500 gal. of mud acid after the breakdown has proved to be good insurance against screenouts of the sand in the well bore. The mud acid cleanses the perforations of drilling mud and cement and this reduces the formation fracturing pressures during treatment. Finally, the Jel X 500 containing the sand is pumped into the well and overflushed from the tubing with 50 bbl. of lease crude.

The pressures required to fracture these formations have been found to average between 0.75 and 0.77 psi. per foot of depth at the formation. These gradients agree with other investigators,[2,3] and are useful in determining the suitability of well equipment, in making plans for the treatment.

Prior Studies

The type of well best suited for Stratafrac application is one that produces from a formation containing oil or gas in commercial quantities, but is incapable of producing it satisfactorily with the existing bottom-hole pressure. This could be a well with low natural permeability, one with shaled or lensed-out sand section, or one in which the natural permeability was damaged in the drilling or completion of the well.

The use of well logs and production histories are important aids in selecting wells for this type of well stimulation. Wells with thin sand sections, wells with high gas-oil ratios, and wells producing from incompetent sands have been successfully fractured to provide sustained production increases of commercial value.

Production histories of wells, following Stratafrac, indicate that two factors play an important role in achieving satisfactory results in formation fracturing in this area. These factors are (1) the use of large quantities of sand and (2) higher sand-to-gel ratios. A treatment using less than 4,000 lb. of propping sand per fracture in a soft formation has in some cases given only a temporary production increase, while those containing more than 4,000 lb. have maintained their production increases. Where amounts greater than 4,000 lb. were used, a noticeable flattening of the production decline curve was noted. (See Fig. 2).

There is strong evidence also from the histories of wells producing from some formations that the use of high sand-to-gel ratios (5 to 6 lb. per gal.) have resulted in greater production increases and flatter decline curves than if the same total quantity of sand had been used in a sand-gel ratio of 1 lb. per gal.

The reason for these improved results can perhaps be explained from the lithology of these formations. When a high-poundage, high-sand-gel-ratio treatment is applied to a soft formation, a thicker wedge of propping sand is forced into the rock. This thick sand wedge is not readily contaminated with formation sand and shaly material, as would be a small quantity of sand spread out in a thin wedge, during a low-poundage or low-sand-gel-ratio treatment.

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T. P. R. C. Report

Estimates of Primary Recovery

. . . from some typical Glen Rose fields in Northeast Texas

by G. J. Loetterle

THE Northeast Texas area as considered in this article consists of 46 counties in the northeastern corner of the state, comprising Districts 5 and 6 of the Texas Railroad Commission. The major structural features in this area are the Mexia-Talco fault zone, which traverses the western and northern portions, the East Texas basin in the central part, and the large Sabine uplift along the eastern side.

Primary drilling objectives for oil and gas include the sub-Clarksville sand, Woodbine sand, Paluxy sand, Rodessa limestone, Pettit limestone, and Travis Peak sand in descending order. The Rodessa and Pettit are members of the Glen Rose formation.

The general primary recovery ranges which have been indicated by actual production history are chiefly the Rodessa and Pettit limestones. The James limestone, which occurs in the section between the Rodessa and Pettit, is developed in porous form in only a few local areas of quite limited extent and concentrated in the central axial portion of the East Texas basin.

Fields which produce from the Glen Rose reservoirs are not confined to any certain portion of the Northeast Texas area but are widely distributed. They are most numerous, however, in the eastern part, and especially in the border counties of Cass, Marion, Harrison, Panola, and Shelby. These counties are situated high on the west flank of the Sabine uplift, and they contain many important Glen Rose gas and oil fields producing from relatively shallow depths of 5,000 to 6,500 ft. This compares to depths of 9,000 to 10,000 ft. required to test the Glen Rose near the axis of the East Texas basin.

The porous Glen Rose limestones include chiefly the oolitic, cellular, and coquina or coquinoid types. With few exceptions, individual reservoirs are of limited areal extent, and permeability and porosity barriers are often found within single fields. There is some tendency for porosity to be best developed near the structural crest, and to decrease or even vanish at low, flanking positions.

Author is consulting geologist, Hudnall, Pirtle & Loetterle, Tyler, Tex.

There is commonly no effective water drive, and the oil-recovery mechanism is predominantly either solution-gas or gas-cap drive. Producing gas-oil ratios are typically on the high side, usually in the range of 400 to 1,500 cu. ft. per bbl. at initial completion, and gradually increasing as the wells are produced. The shrinkage from reservoir to stock tank is correspondingly high.

Porosity and permeability are of a low order as compared to those found in most sand reservoirs and are quite erratic, even in a single field. The Rodessa producing zones are usually somewhat better developed than are those in the Pettit, as set out below:

Zone	Typical Porosity Range Per cent	Typical Average Porosity Per cent	Typical Permeability Range md.	Typical Average Permeability md.
Rodessa	14-20	16-18	10-500	100-200
Pettit	8-16	12-14	1-200	50-100

Connate or interstitial water content is seldom high in Glen Rose reservoirs, and is usually in the range of 15 to 25 per cent of the pore space. The gravity of the oil is high, typically 40° to 43° and a paraffin base is the rule.

Indicated recovery ranges . . . From the general reservoir data, it will be seen that a relatively low oil recovery on an acre-foot basis would be expected from Glen Rose reservoirs. This is due chiefly to low porosity and permeability, erratic porosity distribution, high shrinkage factor, and the lack of an effective water drive. Such indicated low recovery by primary methods has been demonstrated by the production history from these fields.

While very few have been fully depleted, many have obviously produced 80 per cent or more of the oil recoverable by primary methods as evidenced by production decline curves. As the Glen Rose reservoirs are produced, there is always a progressive decline in pressure, and the amount and rate of pressure loss is further indication of the near-depletion, under primary methods, of many of these reservoirs.

A general primary recovery range of 100 to 300 bbls. per acre-foot of net oil sand is indicated, varying chiefly with porosity and permeability development and the type of drive. The higher recovery range is, of course, in those fields where a large free-gas cap exists. The pressure in the gas cap is exerted on the oil, helping to slow the pressure decline and to move the oil outward and downward toward the well bores as the gas cap expands.

Some of the important Glen Rose oil fields in this category occur along the downdip edge as a flanking rim to what is essentially a gas field, with gas occupying all the higher portion of the structure. Outstanding examples are Opelika in the Rodessa and Woodlawn in the Pettit.

The indicated recovery of 100 to 300 bbl. of oil per acre-foot under primary conditions is equivalent in general to from 15 to 35 per cent of the stock-tank oil originally in place in the reservoir. A recovery of around 20 per cent of oil in place would be a close average figure. Since 80 per cent of the oil remains at primary depletion, it is obvious that secondary-recovery programs are desirable where the size of the field, the net pay thickness, and the permeability are sufficient to make such programs feasible.

Primary recovery . . . In connection with this study, eight representative Glen Rose oil fields were selected for detailed recovery analysis, with all zones represented and a wide geographical distribution achieved. All recovery estimates were prepared by plotting actual production decline curves. In selecting the field, three principal guiding factors were observed as follows:

1. The field should not be one such

TABLE 1—NORTHEAST TEXAS AREA PRIMARY RECOVERY DATA TYPICAL GLEN ROSE RESERVOIRS, MAY 1954

Field, county—Producing zone—	Discovery year	Total prod. wells drilled	Wells still prod. on 1-1-54	Average net pay thickness (ft.)	Prod. acres	Cumulative production to 1-1-54 (bbl.)	Estimated oil originally in place per ac.-ft.* (bbl.)	Indicated ultimate recovery from decline curve (bbl.)	Indicated recovery per acre-foot (bbl.)	Indicated per cent recovery of oil in place (per cent)
Blackfoot, Anderson—Rodessa	1947	8	8	7	800	541,135	819	670,000	120	15
Chapel Hill, Smith—Pettit	1940	44	34	20	1,760	3,860,600	489	4,200,100	119	24
Henderson, Rusk—Pettit	1943	32	30	20	1,280	2,134,360	489	2,834,100	111	23
Kildare, Cass—Rodessa	1942	29	21	12	1,700	2,356,864	678	2,966,000	145	21
LaRue, Henderson—Rodessa	1945	5	5	8	600	926,253	838	1,139,800	237	28
Pittsburg, Camp—Pettit	1940	25	20	18	1,400	2,516,038	768	3,165,000	126	16
Rodessa, Cass-Marion—Rodessa	1936	571	176	18	13,550		†977	†74,000,000	309	32
South Tyler, Smith—James	1944	3	1	20	180	774,227	596	816,200	227	38

*Converted to stock-tank oil. †Taken from Hill and Guthrie, Engineering Study of the Rodessa Oil Field in Louisiana, Texas, and Arkansas. U. S. Bureau of Mines R.I. 3715, page 96, Table 43. Includes Miller County, Arkansas, portion of field.

as Opelika, New Hope, or Pickton, where secondary-recovery projects have been in operation for some time.

2. The field should be sufficiently depleted to enable close approximations of ultimate recovery to be made. In such a field, the details of projecting the decline curve to read the indicated future recovery make very little difference in the ultimate recovery figure.

3. Accurate yearly production records must be available for each zone. In some of the important Glen Rose fields which have been producing for many years, such accurate figures by individual zones are not readily available for the earlier years. In other cases commingled oil production from two or more zones is reported, and in still others condensate is reported with oil.

Despite the limitations thus imposed, the fields selected may be regarded as typical. All the others are known to fit the same over-all recovery pattern, even though the records are in some cases incomplete. Some of the fields selected are simply smaller expressions of the larger fields. Moreover, many other fields with sufficiently adequate records could have been included, but we chose only enough to portray the general Glen Rose primary recovery picture in the East Texas area.

All the pertinent data are presented in Table 1. Rodessa field, important though it has been, is one for which it is extremely difficult to obtain accurate production records by zones. So the data developed by Hill and Guthrie in their excellent engineering study of this field were used.

Their report, however, was published in 1943, and it is feared that their ultimate-recovery estimate of 309 bbl. per acre-foot for Rodessa zones analyzed, which is 32 per cent of the oil in place, may be some-what too high. The free-gas cap which occupies the higher portion of the structure near the controlling fault may, however, have had some influence on oil recovery.

It will be seen from Table 1 that, of the eight fields shown, the greatest recovery (38 per cent) of oil in place is from the James limestone in small South Tyler field. While this figure may be entirely accurate, since the zone is so nearly depleted, quantitative data on the exact size of the productive area are lacking. So, after careful study it may prove to be somewhat larger than the 180 acres determined by us.

Henderson and Chapel Hill fields have never been fully developed in the Pettit lime. This is especially true on the south flank of Chapel Hill where outlying wells early demonstrated a large oil-productive segment which was never drilled up due to the thin and relatively tight pay section and the excessive drilling depth.

For these fields, a total productive area of 40 acres for each well has been used. While it is doubtful that one well can effectively drain more than 40 acres for oil in the Pettit, it should be noted that the indicated recovery from the decline curve would be still lower on an acre-foot basis if such were the case.

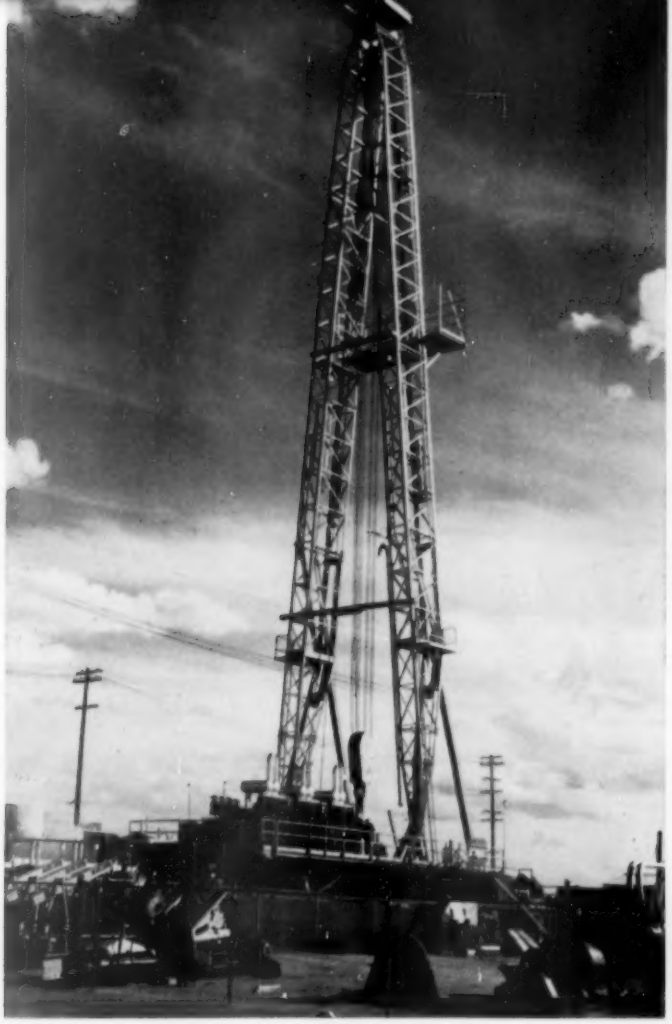
The primary ultimate recovery range for the Glen Rose reservoirs shown on Table 1 is from 111 to 309 bbls. per acre-ft. and from 15 to 38 per cent of stock-tank oil in place. It should be emphasized that these figures are for the entire fields only. They are not necessarily advanced as recoveries to be expected from individual leases. In fields producing by gas-cap-drive, the wells are eventually abandoned due to gas encroachment as the gas cap gradually expands outward and downward. This means that the structurally low wells, which are farthest removed from the gas cap, will have the longest oil life. They will drain oil from the updip direction, and this migratory oil must be taken into account when preparing individual lease recovery estimates. Such structurally low leases will produce far more per acre-foot of pay underlying them than the average recovery for the reservoir as a whole.

Gas recovery . . . Principally because gas is so mobile as compared to oil, and as a result gas fields can be much less densely drilled, there is little question of the profitability of a Glen Rose gas well. There need only be a fair development of permeability and a sufficiently thick pay section. Recovery estimates for new fields can be made by the volumetric or acre-foot approach, based on the reservoir data, as soon as the extent of the productive area is known. After sufficient production history is available, the indicated recovery may be more accurately found by plotting production against pressure decline. This method takes into account the volume of gas being produced per pound of pressure drop and, since it is based on actual reservoir performance, it is quite accurate.

By either method the indicated yield from a typical Pettit reservoir would be around 400,000 cu. ft. of gas per acre-ft. of net pay. A typical Pettit gas well would have 10 ft. of net effective pay section, and on 640-acre spacing would ultimately produce about 2,500,000 M.c.f. of gas.

Similarly, a typical Rodessa reservoir will have an indicated recovery of around 600,000 cu. ft. per acre-foot. The typical Rodessa gas well will have about 15 ft. of net effective pay section with an indicated yield of around 5,750,000 M.c.f. of gas on 640-acre spacing.

Condensate richness varies widely in different fields and, for that matter, in a single field. The richness is greater in structurally low wells as compared to those near the crest. The demonstrable range is from 1 or 2 bbls. per M.m.c.f. in the Rodessa of Joaquin field (Shelby County) to 100 bbls. or more in the Pettit of portions of Woodlawn field (Harrison County). These are extreme examples, however, and the usual range is from 10 to 15 bbls. per M.M.c.f. of gas. The condensate richness ordinarily declines as the reservoir is produced.



Big, but portable . . . Richfield rig has a

Power Output 3,200 Hp. For 15,000-Ft. Drilling

by D. H. Stormont
West Coast District Editor

RICHFIELD OIL CORP.'s new drilling rig in North Coles Levee field near Bakersfield, Calif., is among the largest ever put together from a standpoint of available horsepower.

The many unitization and other features incorporated to achieve portability resulted in attainment of a high degree of mobility despite the size of the rig. This was highly desirable because it is planned to employ the rig about half the time for exploratory drilling in isolated areas.

The rig was designed for 10,000 to 15,000-ft. drilling. It is powered by 18 diesel engines in single and multiple units. Their total power output is about 3,500 rated or 2,800 continuous.

As for mobility, the rig is designed so that within a 24-hour period it can be dismantled and moved to a new location anywhere within a 30-mile radius. It moves in 20 loads, exclusive of drill pipe.

The in-line power plant for the draw works consists of three sets of twin diesels. These offer a total power input to the draw works of 1,260 hp. Each of two mud pumps is powered by two sets of twin diesels with a 600-hp. output, and a mixing pump is powered by a single 250-hp. diesel. In addition, a 150-hp. engine drives a sand reel and two 90-hp. diesels drive 60-kw. generators.

In early April, the rig was drilling its third North Coles Levee well after having completed two approximately 9,500-ft. producers. The first was drilled and completed in 62 days, about average for the field in view of the amount of coring and logging carried out. The second required 54 days. On the third hole, the rig broke the record to the normal pipe-setting depth. This well was spudded 30 hours after moving started.

While designed for 15,000-ft. drilling with 4½-in. drill pipe, there is no question of its capabilities for developing the deep Eocene pay discovered at North Coles Levee last year. Currently no second test is planned to the new pay, in which the world's deepest producer is bottomed at 17,895 ft. When it is drilled, however, this new rig probably will be selected for the job.

Having a hook-load capacity of 600,000 lb. with eight lines strung, the rig was designed for fast hoisting from depths of approximately 15,000 ft. How well it will perform at its designed depth is yet to be determined. On the first well, 101 thribbles were pulled in 100 minutes. Maximum hook load when pulling from bottom was approximately 190,000 lb.

Built as turnkey job . . . An unusual aspect of the rig is that it was handled on a turnkey basis, the first rig ever so assembled in California. All items of equipment were assembled by the vendor, Oil Well Supply Co., in its yard at Bakersfield. The items then were packaged, and the pipe racks fabricated, to Richfield's design specifications. When the rig was put together and ready to drill, Richfield took it over and moved it onto its first location.

Accompanying photographs illustrate most of the rig's features and methods of achieving portability.

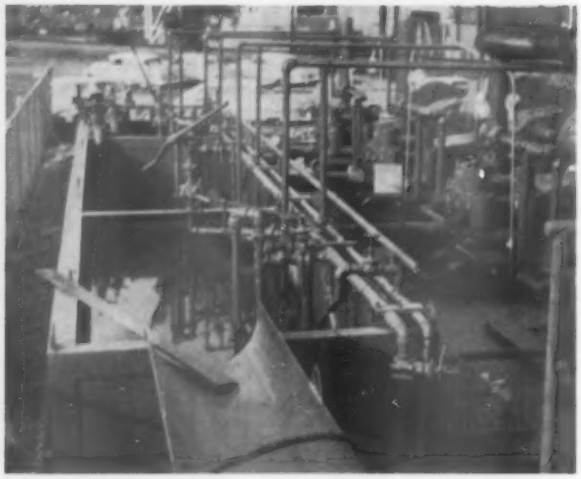
The 10-ft.-high subbase, 56 ft. long by 26 ft. wide, is moved in four loads. All interconnecting members are held together by drive pins so that the four sections can be quickly joined.

As illustrated, an exceptionally large number of auxiliary items have been unitized into the structures. These include two 5-hp. cooling-water circulating pumps, cellar pump, and manifold, mud-chemical storage and 5-bbl. mixing tank, fuel and air headers, two electrically driven compressors for supplying clutch and starting air, and hydraulic-brake-cooling water tank.

Turn the page for picture story of the rig.

. . . Here are details of one of largest drilling rigs ever assembled

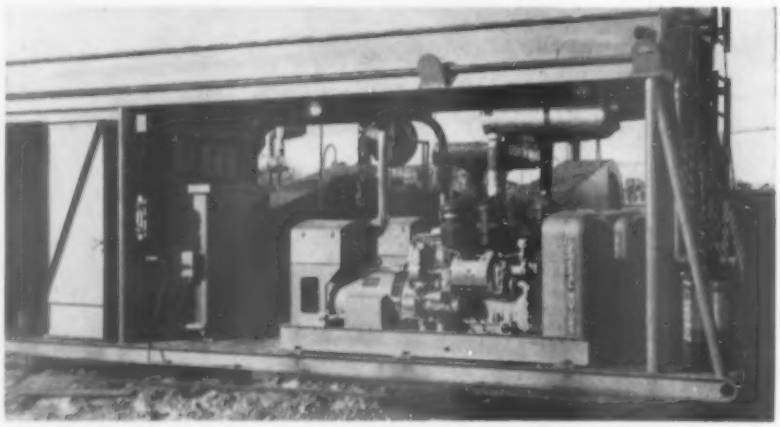
HYDRAULIC SYSTEM drilling mud is supplied by these two 600-hp. pumps which are unitized with twin diesels into 50,000-lb., 9 by 30-ft. packages. Removal of radiators from one set of diesels reduces either package to a legal-weight load for movement over public highways. Pump manifolds are designed for parallel operation.



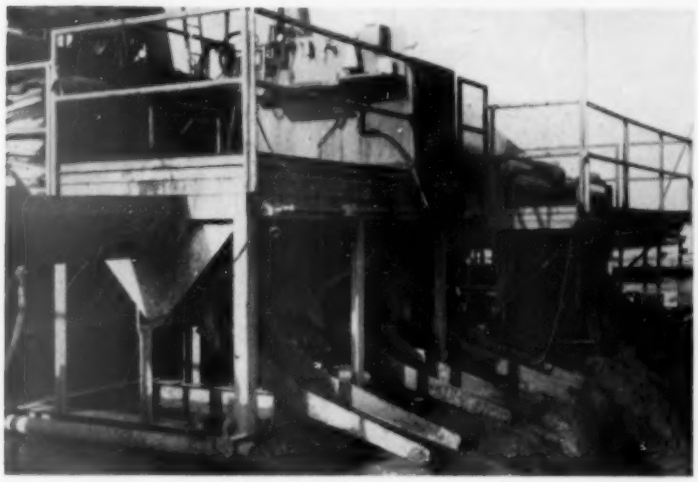
MUD TANKS have all lines and valves unitized so that little time is needed for rigging up or dismantling. As shown here, the "pill" tank is unitized into one end of the pit. Dump valves and cleanout dumps are provided at four points along the length of the tank for ready cleaning. Walkway folds against tank.

BLOWOUT-CONTROL EQUIPMENT . . . Accumulator and control manifold for remote operation of two hydraulic ram-type control heads and an all-purpose head are mounted at one end of the generator house. Flexible lines serve as jumpers from the manifold to the roadside subbase, where they connect into the substructure, as seen at right above. These steel lines are equipped with hammer-type couplings for receiving the lines leading to the blowout preventers and at a crossover section between two subs.

POWER PACKAGE . . . At the drill site, the 10,000-gal. fuel tank sets on top of the skid containing the generators, power control panel, spare-parts storage room, and blowout-control equipment. Four cables are used to carry power to the rigs major sections. There jumpers distribute it from package to package by means of connections unitized into the skid or subbase. When moving, the cables are coiled in the generator house.



. . . Unitization and safety were prime considerations in design

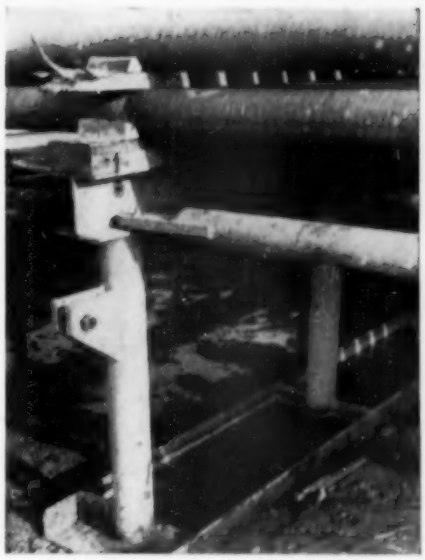


DESANDING UNIT . . . To constantly condition the mud while drilling through sandy sections, this desanding unit is used after the dual mud screens. The unit is divided into three sections, each of which is an inverted pyramid 5 ft. wide and about 2 ft. deep. So that any sand deposited in a section can be readily discarded from the system, one of the triangular sides is hinged at the top. Note the number of electrical outlets provided for lighting and other use, and how jumpers connect one package to another.

MUD-LINE MANIFOLD is unitized into the ditch-side subbase, making it convenient to the pumps. Lines are provided for operating the two pumps in parallel. Parallel operation continued to 8,500-ft. in a recent hole. Each of the mud-pump units, seen in a foregoing photograph, as well as the 250-hp. mud-mixing pump, is equipped with a panel containing air-operated engine throttle and clutch controls. Also on the panels are air-operated safety controls for shutting down the engines in an emergency.

WATER PUMPS are unitized into the roadside subbase. From the pumps, a 3-in. line makes a complete circuit of the rig, with outlets for mud tanks, rig washing, and all other uses. The lines are unitized into the various packages so that rigging up is quickly accomplished. Note how the electric lines are unitized into the subs, with jumpers used between the terminal boxes.

PIPE RACKS are made up of two 20-ft. sections on either flank of the central walkway. Each section is comprised of three wide-base standards held together by spacers, made from discarded drill pipe. An extra section is provided to facilitate handling pipe during moves.



1 Business end of the unit, its rotating head, is shaft-driven from diesel in background.

2 Pipe is lowered into this cradle designed to hold it securely in line with traveling unit while the cleaning is done.

Streamlined Internal Cleaning-Coating Operation

by F. Lawrence Resen
Gulf Coast District Editor

A NEWLY developed unit, designed to clean the internal surface of pipe joints on one pass and spray it with a corrosion-resistant protective coating on the reverse pass, has been developed by Crutcher-Rolfs-Cummings, Inc., at its pipe-coating yard on the Houston Ship Channel.

Purpose of the unit is to provide pipe joints with this internal protection upon their being received from the mill, thereby eliminating corrosive effects during storage. However, it may also be used for pipe already stored and which has become internally rusted.

The protective coating applied is based upon Epon resin, highly impervious to gasoline, kerosine, and various chemicals, making the coated surface desirable for use in products and crude-oil lines as well as gas pipelines.

An additional bonus may be available in improved efficiency of gas lines which are coated with this material. Although no full-scale experiments have been conducted on this matter as yet, the coating dries to a smooth, abrasion-resistant finish, raising the possibility that such a surface may improve the flow characteristics of gas passing through the line.

The new development consists of a rotating head driven by a hollow shaft, 50 ft. in length. The shaft and head are supported by a rigid framework constructed of angle iron, which travels on disk-type rollers running along angle-iron rails.

The entire assembly is powered by a 40-hp. diesel engine, which not only rotates the shaft, but is supported on wheels, so that it may move the assembly in a horizontal direction. This makes it possible to move the rotating head lengthwise through a pipe joint clamped in a cradle positioned in line with the shaft assembly. The diesel engine is coupled to a 100-hp. gasoline motor-driven air compressor which travels with the assembly and provides necessary air.

Working end . . . The rotating head is made up of wire brush cleaner with three spray guns mounted at the end. The driving shaft is made up of 2½-in. oil-well tubing and 100 psi. air passes through its center, so that as the wire brushes clean the interior surface of the pipe as they travel through the joint, the air blows the rust particles out of the joint. As the machine is reversed in direction, the protective coating will then be sprayed onto a clean surface.

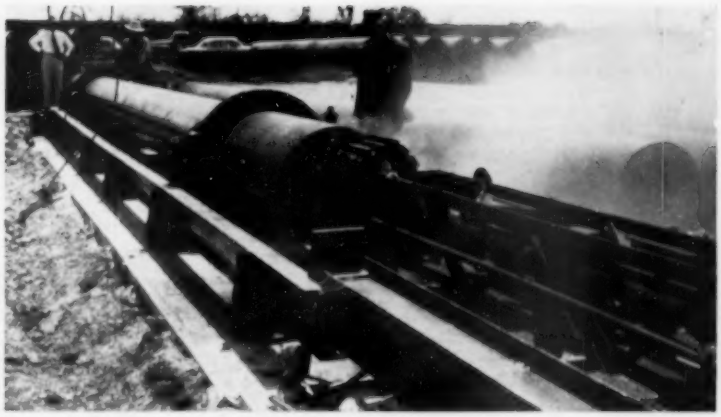
The three spray guns are spaced around the front of the rotating head so that as it rotates, the coating will be applied evenly on the exposed surface. Paint is supplied to the three guns through a gland which compensates for the rotary motion of the head. The paint is stored in a can near the operator who rides on the diesel engine, and air is used to pressure it through a ½-in. line to the gland. The ½-in. line is secured alongside the rigid framework of the assembly, while an appropriate manifold is located on the head to carry the paint from the gland to the three guns.

Rapid cleaning . . . It takes approximately 1 minute for the unit to clean and coat one 40-ft. pipe joint, as received from the mill. This means that the joint will be cleaned by the rotating brushes as they pass through the joint, and when the direction of travel is reversed, the joint is coated by the spray guns. In traveling through the joint, the rotating head and assembly is supported by the disk rollers, which run along the bottom portion of the joint.

In the demonstration made by C-R-C, Jim Cummings, developer of the unit, noted that the joints had been stored some 56 days and the accumulation of rust required three passes with the wire brushes before the surface was sufficiently cleaned so that it could be coated. Approximately 1 gal. of rust and scale was removed from the interior of a 24-in. pipe joint stored this long.

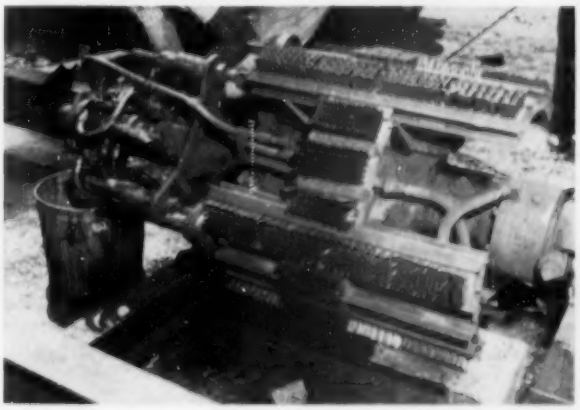
The demonstration unit is capable of handling 18 to 24-in. pipe. With various modifications, one can be adapted to

3 Once the pipe is secured in the cradle, the operator moves the cleaning unit forward.



4 As it enters the pipe joint, the unit's wire brushes rotate to clean the surface while an air stream blows particles clear of the pipe.

5 On first pass-through, rust particles are removed. As the unit head is removed, spray guns begin coating pipe interiors.



6 The unit's spray guns (arrowed) receive paint through a gland (right) which discharges into a three-way manifold.

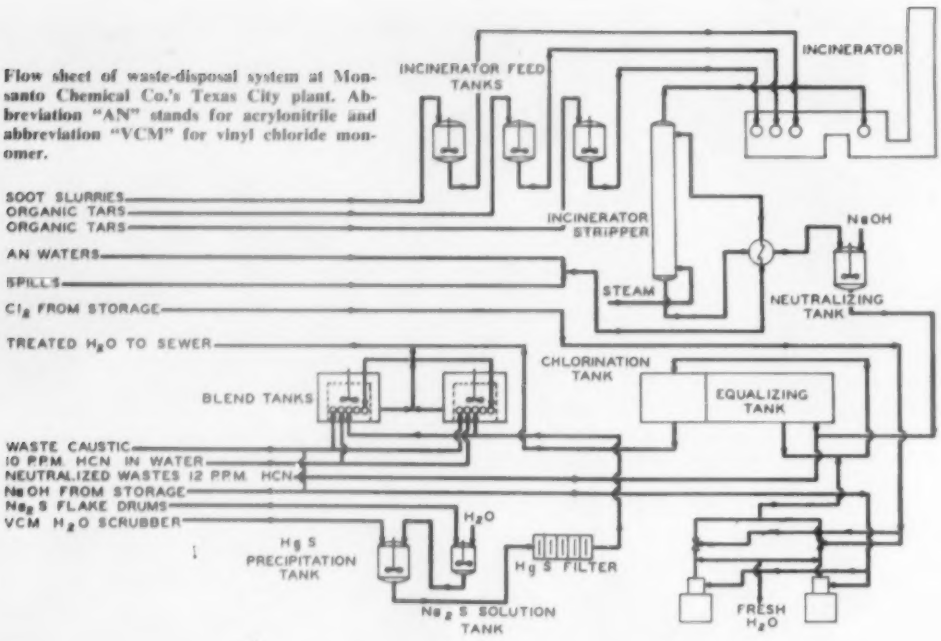
7 Paint for the guns is supplied from this pressurized can. Air is supplied from the compressor in the power unit (rear).

8 The finished product—pipe thoroughly cleaned and coated with an abrasion-resistant interior finish.

handle the larger and smaller-diameter sizes of pipe.

Coating . . . The Epon resin base used in the protective coating formulation is made from condensation polymers of epichlorohydrin and bisphenol. The material cures to a flexible film which has a high degree of elasticity and is unaffected by hard blows, severe stresses or bends. It was applied to a thickness of 2 mils, which air-dried in about 5 minutes. This required about 3 qt. per 40-ft. joint. Final curing is normally effected within 5-7 days, although when the pipe is stored under a summer sun, this is cut down to about 2 days. Under normal storage conditions, it is expected to maintain a corrosion-resistant film for more than a year.

This Epon resin coating was especially formulated for the C-R-C machine in the laboratory of Coast Paint & Lacquer Co., Inc., of Houston.



Flow sheet of waste-disposal system at Monsanto Chemical Co.'s Texas City plant. Abbreviation "AN" stands for acrylonitrile and abbreviation "VCM" for vinyl chloride monomer.

Wastes Are Burned . . .

"Why so many flares?" This question may be one of the first asked by the visitor to Monsanto's Texas City, Tex., plant. The answer lies in Monsanto's waste-disposal program. All organic wastes at this plant are burned insofar as is possible.

Monsanto has invested at Texas City nearly $1,000,000 in equipment for its waste-control program. Operating costs for the waste disposal are about $25,000 per month.

From natural gas and propane Monsanto presently makes ethylene and acetylene at Texas City. These then go into production of styrene, vinyl chloride, and acrylonitrile. Some waste-disposal problems faced by Monsanto: (1) how to treat waste catalysts, (2) what to do about soot formation accompanying acetylene production, (3) how to handle cyanide wastes, and (4) how to solve the problem of acrylonitrile leaks or spills.

Here are some of Monsanto's methods: (1) A "leak committee" keeps operators on the alert for leaks, (2) dilution takes care of some wastes, (3) azeotropic distillation is used to recover hydrocarbons from waste water, and (4) steam stripping is employed to remove acrylonitrile wastes.

These methods plus plenty of incineration have insured Monsanto of clean operations and a satisfactory relationship with the Texas Health Department and Texas Game and Fish Commission.

How Monsanto Controls Air and Water Pollution

by Dr. H. E. Morriss

THE plant of Monsanto Chemical Co., at Texas City is located on Galveston Bay adjacent to the city and the port facilities. The first units of the plant went on stream late in 1942 for the production of styrene monomer for the Office of Rubber Reserve, which owned the plant, with Monsanto as operators.

Wastes from Styrene Manufacture

The process for the production of styrene is comparatively simple but it does involve handling large quantities of materials which could be troublesome if not confined. In the initial design it was agreed that insofar as possible all organic wastes would be burned. Most of the vents were piped to flare stacks and liquid wastes were burned as fuel in the boilers.

The ethylene plant presents few problems. The waste gases are burned as fuel and most of the liquid byproducts can be sold. Since the purification unit operates under pressure, all relief valves are piped to a flare stack.

Author is associate director of plastics division, Monsanto Chemical Co., Texas City, Tex. Paper presented at Southern Industrial Wastes Conference, Houston.

In emergencies the units can also be depressured to the flare. The liquid byproducts of this operation are largely aromatic in nature. Consequently any leaks to the sewer could be detected, as will be described later.

Waste-catalyst problem . . . The second step in the process involves the reaction of ethylene with benzene in the presence of an aluminum chloride catalyst. The disposal of waste catalyst presented quite a problem. In our process the catalyst is washed with water to decompose the complex giving an aqueous solution of aluminum chloride, which was sewered. Although the hourly quantities were comparatively small, the alkalinity of the bay water promptly precipitated an aluminum hydroxide floc producing a milky appearance in our main outfall. It was alleged that this floc would plug fish gills although we were never able to demonstrate this in experimental work.

What happens to the fish? . . . There were some data on the effect of aluminum chloride on fresh-water fauna but very little in salt or brackish water. As a consequence we made a grant in aid

to the Department of Marine Biology of University of Houston to determine the minimum lethal concentration of the salt on marine fauna in Galveston Bay while we sought other ways of avoiding the nuisance.

The data from the university project indicated that most marine animals could tolerate surprising quantities of aluminum chloride but were more sensitive to the acidity which it produced if present in large amounts. The results showed that our effluent was normally innocuous if not too clear. Limits were set at about 10 per cent of the reported minimum lethal concentration and checked by regular analyses for aluminum in the outfall. During the course of this work it was found that most of this aqueous solution could be disposed of in another manner and avoid practically all of this pollution.

Dilution . . . The alkylate from this (ethyl benzene) unit is washed with water to remove the acidic components. While the amount of acidity is very low and readily neutralized by caustic, this water does contain dissolved aromatic hydrocarbons. Here again we had a problem since these materials are known to be toxic and are not too readily decomposed by biological oxidation. Fortunately we were able to depend upon dilution to keep the level down. This plant used bay water for cooling on a once-thorough basis, hence we had plenty of water for dilution.

Aromatic hydrocarbons . . . Since these were present in most of the plant it was essential that we keep a close survey on all sewers. To this end our research group developed an extremely sensitive chemical method for the determination of aromatic hydrocarbons in water. This method was used for routine surveys of all plant sewers. This program was supplemented by a leak committee which made frequent plant-wide inspections checking up on all possible sources of leaks which might contribute to pollution. Possible trouble spots such as pump packing glands, sample valves, exchanger cooling water, etc., were checked for aromatics. This proved to be a fruitful method of keeping operators alert to watch for such leaks.

Azeotropic distillation . . . The catalytic dehydrogenation of ethyl benzene to styrene is carried out in the presence of large quantities of steam. When condensed this water is saturated with almost 0.1 per cent aromatic hydrocarbons. This represented a potentially serious source of pollution. It was finally decided that pollution could be avoided on a breakeven basis by carrying out an azeotropic distillation on this water to recover the hydrocarbons. The contaminated water is fed to a stripping column and sparged steam removes the aromatics which are returned to the separator. The still bottoms are sufficiently stripped to be suitable for reuse for steam generation.

"Our experience would indicate that it is advisable to obtain toxicological data on marine life indigenous to the area in exactly the type of water characteristic of the plant outfalls. If such tests cannot be run at the plant site, they should at least be made on water from the area."

New Problems—Acrylonitrile and Vinyl Chloride

In 1952 Monsanto built plants in Texas City for the production of acrylonitrile and vinyl chloride. These operations brought with them a whole series of new disposal problems. We have adopted the policy that no process is complete unless it can be operated without pollution of air or water. These new operations posed some severe problems and after a little over a year of operation we can say with reasonable assurance that the program to be outlined is workable.

The new plants involved units for the production of oxygen, acetylene, hydrogen cyanide, acrylonitrile, ethylene dichloride, hydrogen chloride, and vinyl chloride. Of these only the oxygen plant involved no disposal problems!

One of our research chemists spent considerable time at the Texas Game and Fish Commission Marine Laboratories at Rockport, determining the minimum lethal concentrations on a wide variety of possible pollutants on marine fauna typical of the Gulf Coast area. This work pointed up the variations which may exist in different qualities of water. Data obtained in fresh water or sea water may not be applicable in brackish waters which characterize many of the plant sites along the gulf.

Study local waters . . . Our experience would indicate that it is advisable to obtain toxicological data on marine life indigenous to the area in exactly the type of water characteristic of the plant outfalls. If such tests cannot be run at the plant site, they should at least be made on water from the area. There are too many variables involved to accept reputable work done in California, Minnesota, or New York—such data are good for that locale but they may or may not hold for gulf waters.

Some of the compounds tested in this work included acrylonitrile, lactonitrile, hydrogen cyanide, and acetaldehyde. Most of these results were published by F. M. Daugherty, Jr., of the Texas Game and Fish Commission Laboratories, and J. T. Garrett, of Monsanto, in the Texas Journal of Science. Some further work was completed on chlorinated aliphatic compounds which has not been published to date.

Acetylene Production and the Soot Problem

Processes for the production of acetylene by the partial combustion of natural gas almost invariably involve the formation of soot. Most readers are well aware of the air-pollution problems involved in the production of carbon black from natural gas. While the processes have different objectives, the chemistry is similar, and we could not have clouds of soot blowing around. We were also aware of the problems encountered in some of the synthetic-rubber copolymer plants which added carbon black to the polymerization process. The black suspended in water created a mean pollution problem. Facing these facts we knew we had to dispose of soot without air or water pollution.

Burn the soot . . . While carbon is quite combustible there are times when it is quite refractory and to add to the problems the soot particles are extremely fine—electron microscope studies indicated we had particle sizes in the range of 10A° to 20A°. Burning of the soot was the only feasible solution and after prolonged discussions with incinerator designers, a design evolved which it was hoped would handle soot slurries without a wisp of black smoke. We're not certain that this was the first such installation but the furrowed brows of the designers indicated that it was unusual and we're happy to report that it works. In-plant mishandling of sooty streams has, at times, messed up our piping color-code system, but beyond our fences neither people nor fish are bothered by the fact that we make soot in our processes.

The Hydrogen Cyanide Problem

Hydrogen cyanide is an extremely toxic compound. Although millions of

"We studied the possibilities of chlorination of the plant stream but found that the chlorine demand might be much too high for economical application and even at low contamination levels would be hard to control. As a consequence we settled on a steam stripping system to remove the contaminants from water."

pounds are made in this country and several other widely used chemicals are actually more toxic, to most people cyanide means poison. Here again we faced real problems for safe in-plant handling as well as innocuous disposal. In contrast to some other toxic chemicals, hydrogen cyanide can be burned completely to harmless products. Since it is reasonably volatile, the disposal of any waste gas stream containing HCN was simple. We verified the fact that gases varying from 100 per cent to low concentrations could be flared safely if necessary. With this knowledge we built a flare stack to handle emergencies or startup problems.

Cyanide waste . . . After an extensive study of several alternates, we settled on the alkaline chlorination of aqueous cyanide wastes for the safe disposal of such streams. This process is well known and is readily controlled by automatic instrumentation. In our experience, this method of disposal has worked effectively. We had some problems with lag but after solving these we have had no difficulties in processing relatively large volumes of low-cyanide waters.

Detecting minute HCN . . . As a part of our plant safety program, we developed a special instrument capable of detecting minute traces of HCN in air. This instrument proved quite effective and is currently in operation in our HCN area. Its primary function is to detect leaks of vapors particularly in the storage area. It is set so that it automatically monitors samples of air drawn from several locations and rings an alarm if the HCN content of the air being sampled exceeds 40 p.p.m. It can be set at a lower level but we have found this level more practical.

Acrylonitrile Problems

The acrylonitrile plant also presented some major problems from the standpoint of water pollution. This product compares with benzene in volatility, is readily burned to harmless products, but contact with the liquid should be avoided because some people develop blisters either from acrylonitrile or the hydrolyses products.

Our studies at the Rockport laboratories indicated that acrylonitrile is not a suitable ingredient to add to the diet of a fish. While it hydrolyses slowly in alkaline waters to harmless products, fish object to waters containing more than 25 p.p.m. This information posed two problems. In the first place we recognized that process waters containing this and related compounds would require treatment, and secondly, since it must be assumed that process leaks or spills will occur even in a clean plant, we had to be in a position to handle even storm-sewer waters if a spill happened during a rain storm.

Steam strip . . . We studied the possibilities of chlorination of the plant stream but found that the chlorine demand might be much too high for economical application and even at low contamination levels would be hard to control. As a consequence we settled on a steam stripping system to remove the contaminants from water. Fortunately the compounds are all reasonably low boiling hence it is possible to steam strip them from water leaving a bottoms product which goes to chlorination and an uncondensed overhead product which is fed directly to the incinerator. Laboratory data indicated that the organics were burned completely to harmless products.

Special sewer system . . . The surface waters from the HCN and acrylonitrile plants are handled in a special sewer system. This water flows through a concrete sump and during normal operation, goes directly to the main sewer. If a spill occurs, a block valve on the exit is closed and a sump pump started which moves this contaminated water to the steam stripper. A hold tank is provided in case the volume of water to be treated exceeds the capacity of the stripper.

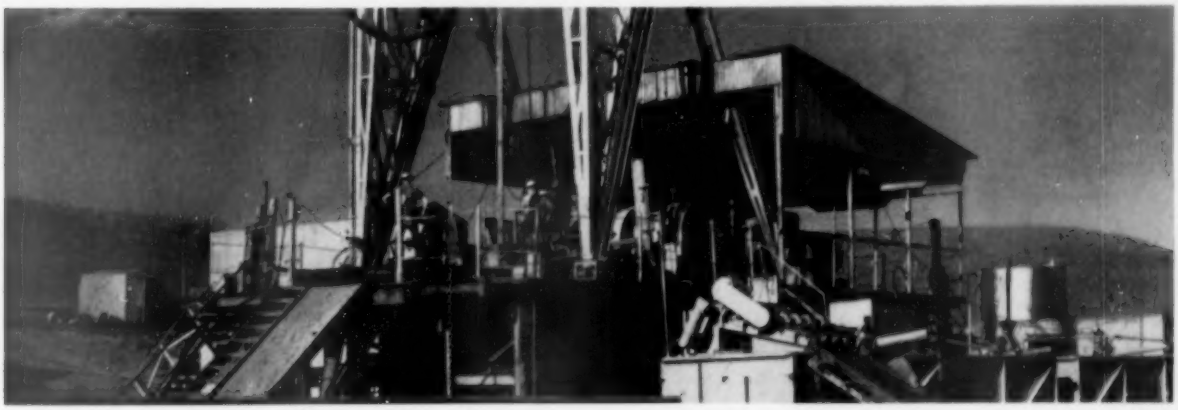
Getting rid of copper . . . The acrylonitrile process involves the use of copper which is quite toxic to fish. We also recognized that provision must be made to keep the copper ion below the minimum lethal concentration in case such waters had to be handled. Since we had previously established the minimum of lethal concentration for aluminum, we settled on a displacement system for removing metallic copper from contaminated water. In this system, any water which might contain copper is percolated through a bed of metallic aluminum. The copper deposits out and the aluminum goes into solution and as a consequence a harmless stream of water goes into the plant sewer.

Vinyl chloride operation . . . Here the major pollution problem involved the mercury salts used as catalysts in the system. Although there is not too much danger that the mercuric chloride would leave the process it was deemed advisable to provide for this possibility. The vinyl chloride from the reactors is washed with water and these wash waters are sulfide treated to remove any mercury as an insoluble salt which precipitates and is readily removed. Here again we have a very effective method of removing a potentially severe water pollutant.

More incineration . . . The disposal of the high-boiling tars from this operation also involves incineration. This disposal technique has been moderately if not completely successful. These tars have some tendency to form an HCl fog when the humidity is high. The high-boiling residues from acrylonitrile and other plant operations are also handled by burning and as a consequence we have a substantial volume of combustion gases to dilute the total stream. If we have substantial quantities of chlorinated tars to process we watch wind direction and burn any excess when the wind will carry any plume out over the bay. The quantities of material are comparatively small but when the humidity is high, a small quantity of HCl can create quite a cloud.

Oxygen analyzer . . . Whe have installed a recording oxygen analyzer on our incinerator stack. We need not only good combustion control to assure decomposition of all organic wastes but we also want an excess of oxygen in the effluent. We need more than complete combustion and we have found that an oxygen instrument is more satisfactory as a control measurement than the more usual combustion controls.

LITTLE BEAVER FIELD SCENES . . . Tank truck picking up oil at a lease tank battery, and a 324,000-in.-lb.-capacity pumping unit driven by a 605-cu.-in. displacement gasoline engine.



GLENDIVE FIELD SCENE . . . Typical drilling scene of Zach Brooks Drilling Co. making hole for The Texas Co. Rig is a Model N-7 draw works driven by two butane engines.

It's Tough Drilling on Cedar Creek Anticline

Diamond coring standard practice in this portion of Williston

by Joseph A. Kornfeld

MAJOR drilling problems on the Cedar Creek anticline in the eastern Montana portion of the Williston basin are caused by salt, anhydrite, and gypsum in the lower Paleozoic strata.

Diamond coring of the entire pay section is standard practice in many of the fields along the southern part of the anticline.

During the early development of the area, major companies such as Shell Oil Co. carried out extensive coring and drill-stem-testing programs in order to evaluate thoroughly the pre-Pennsylvanian carbonate section. Reduction of testing in development wells, however, as reservoir data accumulated, has cut down the over-all drilling days by almost one-half. This has resulted in a substantial saving in drilling costs.

Cedar Creek anticline . . . The Cedar Creek or Baker-Glendive anticline is a large regional feature with oil fields strung out 100 miles along its axis. There are seven producing areas on this northwest-southeast trending structure (Fig. 1).

All of these fields produce from pre-Mississippian rocks. Deer Creek, Yellowstone, Cabin Creek, and Little Beaver produce from the Ordovician. Sand Creek, Glendive, and Pine produce from a Siluro-Ordovician section.

Production is controlled largely by local structural closure on the main anticlinal trend. Locally faulting is a factor in production.

The area is especially attractive to operators because of the multiple pay zones on a known anticlinal trend.

Richey . . . Richey field, which lies between the Cedar Creek and Poplar anticlines, produces from the Mississippian (Charles and Mission Canyon) at a depth of 7,200 ft. Many of the wells produce considerable water along with the oil.

Contractors and equipment . . . Drilling contractors active on the Cedar Creek anticline include R. L. Manning, Inc., Denver; Zack Brooks, El Dorado, Ark.; Pioneer Drilling Co., Cas-

Author is petroleum consultant-geologist, Tulsa.

TABLE I—PRODUCTION DATA—CEDAR CREEK ANTICLINE FIELDS, MONTANA
(Data: Shell Oil Co.)

	Little Beaver	Cabin Creek	Pine	Glendive	Southwest Richey	Richey
Producing wells	3	1	8	13	3	10
Dry holes	2	0	4	4	2	4
Drilling wells	0	2	1	0	0	0
Producing depth, average feet	8,500	8,900	9,000	9,100	9,200	7,100
Produced gas-oil ratio, cu. ft. per bbl.	200	300	200	250	650	250
Produced oil gravity, °A.P.I.	28	33	33-36	38	48	38
Reservoir pressure, orig., psig.	3,830	4,130	4,200	4,300	4,415	3,540

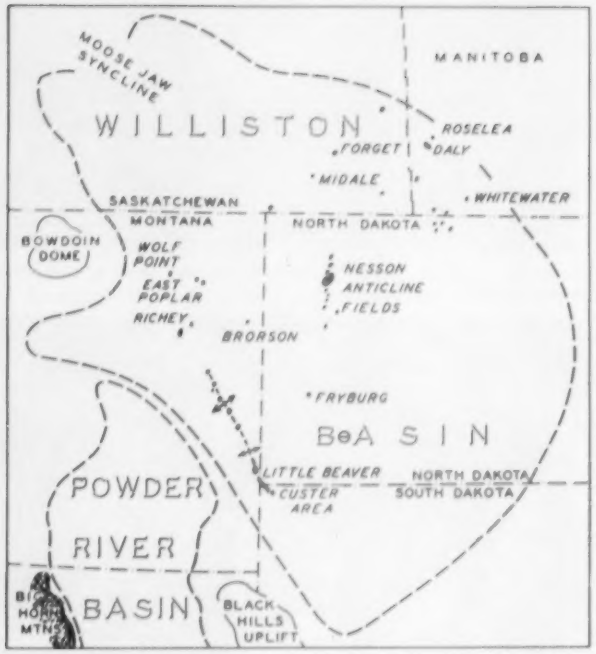


Fig. 1—Production on the Cedar Creek anticline is controlled by local closure along the main anticlinal trend.

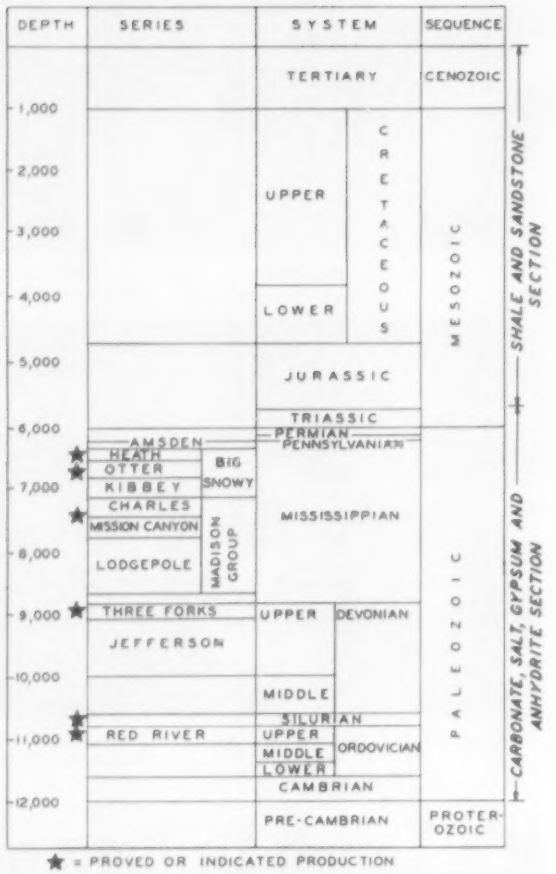


Fig. 2—Fresh-water mud is used to drill the shale and sandstone section of the Cretaceous. The lower carbonate, salt, gypsum, and anhydrite section is drilled with a gypsum-based mud. Operators normally convert at the top of the Piper limestone just above the Triassic Spearfish formation.

per; Brinkerhoff Drilling Co., Casper; J. D. Sprecker, Casper; Hewitt Gulick, Denver; Loffland Brothers Co., Tulsa and Denver; and H. & H. Drilling Co., Casper, Wyo.

In Glendive field, Zach Brooks operates a Model N-7 draw works equipped with a 60-in. auxiliary brake, for 9,000-ft. development drilling. Rig is powered by two Model LRZ butane engines which operate the draw works and the first pump, a 7¾ by 16-in. unit.

Standby facilities include a Model LRZ butane engine which drives a 7¾ by 16-in. mud pump.

Rig is mounted on a 133-ft. steel mast equipped with a 10-ft.-high substructure.

Pioneer Drilling uses a Model G.B. 800 draw works mounted on a 129-ft. portable mast equipped with a 10-ft.-high substructure. Rig is powered by three diesel engines which operate the draw works and two 7¾ by 16-in. mud pumps.

Drilling Practices

On developmental wells drilled on the Cedar Creek anticline, a 15½-in. bore hole is cut for the surface pipe and a string of 10¾-in. pipe set. From 900 to 1,100 sacks of cement are placed behind the pipe. Long hole is usually 9 in. for exploration to Mississippian, Devonian, Silurian, or Ordovician objectives. A string of 5½-in. production pipe is set on bottom through the deepest pay zone penetrated and 600 sacks of slow-set cement placed behind the pipe.

Shell Oil Co. requires its contractors to hold bore hole to within 2° from surface to 3,000 ft., to 3° from 3,000 to 6,000 ft., and within 6° from 6,000 ft. to total depth.

Days to Drill

About 100 days were required to drill and complete Shell's discovery well, 22-25B Unit. However, drilling time was reduced to 70 days for Unit 21-33 drilled to 9,200 ft. More recently Shell's 22-23B was drilled in only 52 days to 9,000 ft.

Discovery well at Pine Unit drilled by Shell required 90 days to drill 9,100 ft. By summer of 1953, days to drill were cut to 50 days.

Discovery well of Shell Oil Co. in Little Beaver field required 101 days to 8,600 ft. Offset wells were drilled in less than half that time.

Wells drilled in Glendive field are cut with a 17½-in. bit to 1,100 ft. where the 13⅜-in. surface pipe is set.

TABLE 2—DIAMOND-CORE DATA FOR VARIOUS FIELDS ON CEDAR CREEK ANTICLINE, MONTANA*

Field—Producing formation—	Bit diameter (in.)	No. of cores	Total ft. cored	Recovery in ft.	Coring performance (ft. per hr.)	Weight on bit (lb.)	Rotary table speed (r.p.m.)	Pump pressure (psi.)	Fluid volume (g.p.m.)
Richey—Charles dolomite (Mississippian)	8⅞	5	300	300	2 to 4	8-12,000	50-65	750-1,000	300
Pine Unit—Red River (Ordovician)	8⅞	3	180	180	2 to 3	8-12,000	50-65	1,100	300
Glendive—Red River (Ordovician)	8⅞	4	200	200	2 to 4	8-12,000	50-65	1,000	310
Little Beaver—Red River (Ordovician)	6¼	4	200	200	2½ to 4	8-12,000	55-60	1,000	210

*Data: Christensen Diamond Products Co., Denver.

TABLE 3—DRILLING PROCESSES IN CEDAR CREEK AND GLENDIVE FIELDS, MONTANA
(Data: E. A. Polumbus, Jr., Denver)

	Well A*	Well B†
Surfaces to Charles:		
Thickness interval	6,930	7,010
Net days	32	27
Number of bits	36	33
Feet per net day	216	259
Feet per bit	192	212
Drilling weight, thousands of tons	10	9
Table speed, r.p.m.	60-90	80-150
Pump pressure, psi.	800-1,000	800-900
Charles to total depth:		
Thickness interval	2,149	2,192
Feet cored	627	81
Net days	39	29.3
Number of bits	52	44
Feet per net day	55	75
Feet per bit	39	48
Drilling weight, thousands of tons	18-20	10-12
Table speed, r.p.m.	60	80
Pump pressure, psi.	1,000	800

*The Texas Co. 1-G NPRR Survey, Cedar Creek field, Dawson County, Montana. †Shell Oil Co. 34-26-G NPRR Survey, Glendive field, Dawson County, Montana.

Shoe is drilled under the surface pipe with a 9-in. bit to the Red River Ordovician limestone - dolomite objective found at 9,908 ft. Long string of 5½-in. is set through the pay and cemented with 600 sacks. Completion is made with jet perforator and a shot density of four shots per foot is employed. Initial acidization treatment uses 100 gal. per foot of pay. Treatment depends upon the position of the oil-water contact.

Diamond-Coring Data

Charles dolomite at Richey . . . The 300-ft. pay section at Richey, the Charles dolomite, is cored using diamond bits. Sixty-foot cores are cut and recovery is normally 100 per cent (Table 2).

Mud Program

In the Glendive area, two different types of drilling fluids are required for the two major, distinct lithologies encountered. The upper group (Fig. 2) ranging from surface to about 5,000 ft. is comprised of shale with some sandstone which is accompanied by considerable bentonite; this requires the use of a fresh-water mud. The lower group, from 5,000 ft. to total depth, consists of a limestone and evaporite section and requires a gypsum-based mud.

Upper section . . . In this interval about 115 lb. of bentonite is used per day or a total of about 1,600 lb. on a 14-day period. In addition, 295 lb. of caustic (21 lb. per day) and 825 lb. of quebracho (59 lb. per day) are required.

When crews start up under surface pipe, a 9.2-lb. mud is carried with a viscosity of about 43 seconds A.P.I. When the Newcastle section of the Cretaceous is encountered, mud weight is raised to 10.0 lb. per gal., and viscosity held at about 40 to 43 seconds A.P.I.

Lower section . . . The lower group, which extends from 5,000 ft. down through the Ordovician Red River objective, consists mainly of limestone with some sandstone and shale with considerable evaporites. Anhydrite and gypsum are found in the lower section; salt in extensive amounts is present in the Triassic Spearfish formation, the Mississippian Charles formation, and the Devonian section. To condition drilling fluids for penetration through evaporites, the mud system is therefore converted to a gypsum-based mud at the top of the Triassic Piper lime just above the Spearfish formation.

In the lower section, a typical mud additive program is shown by the following for the interval between 5,000 to about 9,000 ft. Addition of the brine gel used to saturate the drilling fluid while penetrating the salt sections lowers gel strength, increases mud weight, but does not materially affect water-loss property and Fann viscosity.

Additive, lbs.—	Per day	Total
Barite	612	33,000
Brine gel	735	39,700
Driscol	8	420
Gypsum	65	3,500
Preservative	62	3,355
Starch	745	40,200

Mud programs are summarized in Table 4 for wells drilled in Glendive, Pine Unit, Cedar Creek, and Little Beaver fields.

"You ran into a hunter—Zatso—what's he hunting?"

Well logging . . . The following set of logs are used in drilling developmental wells: conventional electrical log, LateroLog, MicroLog, limestone log, and gamma ray-neutron log. Logging practice differs on exploratory wells. A conventional electrical and MicroLog are run in the Piper lime before any evaporite section is penetrated. From that point to total depth, one to two intermediate surveys are conducted with MicroLog and LateroLog.

At total depth, final surveys are made using the LateroLog, MicroLog, the West Texas limestone log, and the gamma ray-neutron log. The gamma ray-neutron log has proved to be an excellent tool for wells drilled on the Cedar Creek anticline because it aids in geologic correlation and porosity evaluation through calibration of neutron log to obtain quantitative porosity evaluation.

TABLE 4—TYPICAL MUD PROGRAMS FOR GLENDIVE, PINE UNIT, CEDAR CREEK, AND LITTLE BEAVER OIL FIELDS, MONTANA

County: Dawson; Field: Glendive
Well A—(TD 8,857 ft.)

Depth, ft.	5,300	8,857
Weight, lb. per gal.	9.6	10.0
Viscosity (funnel), sec. A.P.I.	42	48
Initial gel, grams (Stormer)	25-30	40-45
Filter loss, cc. A.P.I.	9.2	8.4
pH	7.0	7.0
Salt, p.p.m.		1,000
Preservative, lb. per bbl.	0.20	0.30

Converted to gyp-base mud at 5,245 ft.

County: Wibaux; Field: Pine Unit
Well B—(TD 9,078 ft.)

Depth, ft.	5,679	9,078
Weight, lb. per gal.	10.1	10.1
Viscosity (funnel), sec. A.P.I.	44	56
Initial gel, grams (Stormer)	35-40	30-30
Filter loss, cc. A.P.I.	10.2	7.6
pH	7.0	7.0
Salt, p.p.m.	66,000	60,000
Preservative, lb. per bbl.	0.20	0.25

Converted to gyp-base mud at 5,151 ft.

County: Dawson; Field: Cedar Creek Ext.
Well C—(TD 10,360 ft.)

Depth, ft.	5,890	9,165
Weight, lb. per gal.	10.3	10.2
Viscosity (funnel), sec. A.P.I.	51	62
Initial gel, grams (Stormer)	35-45	45-50
Filter loss, cc. A.P.I.	8.5	9.4
pH	7.0	7.0
Salt, p.p.m.	350	12,000
Preservative, lb. per bbl.	0.25	0.25

Converted to gyp-base mud at 5,084 ft.

County: Fallon; Field: Little Beaver
Well D—(TD 8,648 ft.)

Depth, ft.	5,155	8,648
Weight, lb. per gal.	9.7	9.5
Viscosity (funnel), sec. A.P.I.	36	65
Initial gel, grams (Stormer)	35-35	40-45
Filter loss, cc. A.P.I.	9.2	7.6
pH	7.0	7.0
Salt, p.p.m.	Nil	23,000
Preservative, lb. per bbl.	0.30	0.20

Converted to gyp-base mud at 4,943 ft.

Two reactors at Southwestern's plant are connected in series. Bottoms of vessels are surrounded by skirt.

Fig. 2—(Right) Hydrocarbon purifier reactor.

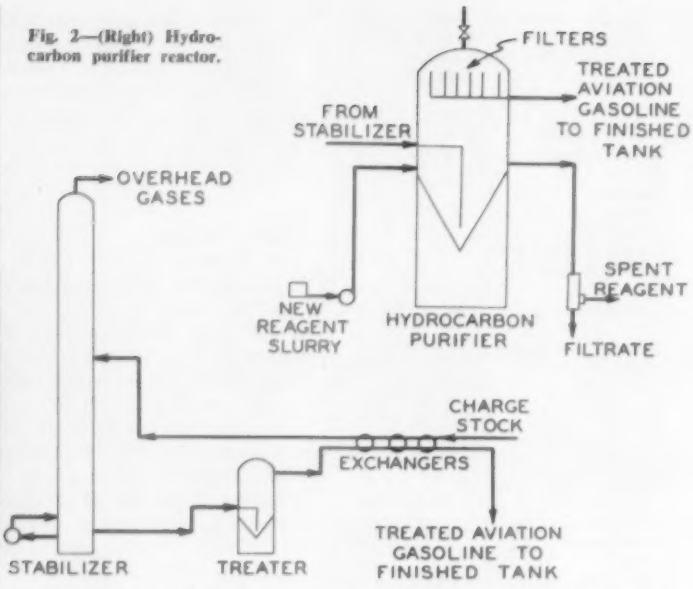


Fig. 1—Aviation-gasoline hydrocarbon purifier. Hot avgas from the stabilizer is charged to reactor where it comes into contact with the reacant.

Refining Pointer

Hydrocarbon Purifier Reduces Aviation-Gasoline Corrosivesness

Unit suitable for treating light products generally

by F. Lawrence Resen
Gulf Coast District Editor

SOUTHWESTERN OIL & REFINING CO., Corpus Christi, Tex., has developed a hydrocarbon purifier for the purpose of rendering aviation gasoline negative to the copper-dish corrosion tests.

The unit operates to pass hot aviation gasoline through a reactant aggregate which neutralizes corrosive contaminants in the stream, whereupon it is sent directly to storage. The treater is particularly adapted to avgas corrosion removal, but is also suitable for the treating of light products generally.

Process . . . In unit flow (Fig. 1), hot aviation gasoline (275°-300° F.) from the stabilizer is charged to the reactor where it comes in contact with the reactant. Southwestern uses two reactors in parallel. After purification, the avgas is filtered in the reactor and then passes through a heat exchanger battery where it is cooled before being sent to storage. Pressure drop across the reactor averages 15 psi., with operating pressure dropping from 100 to 85 psi. approximately.

The reactor consists of a cone-bottomed vessel containing the reactant aggregate, with a number of filter socks located near its top. Incoming gasoline is discharged into the reactant bed by the downspout located inside the reactor. This incoming stream serves to maintain violent agitation within the unit, thereby providing efficient contact between the reactant and the charge.

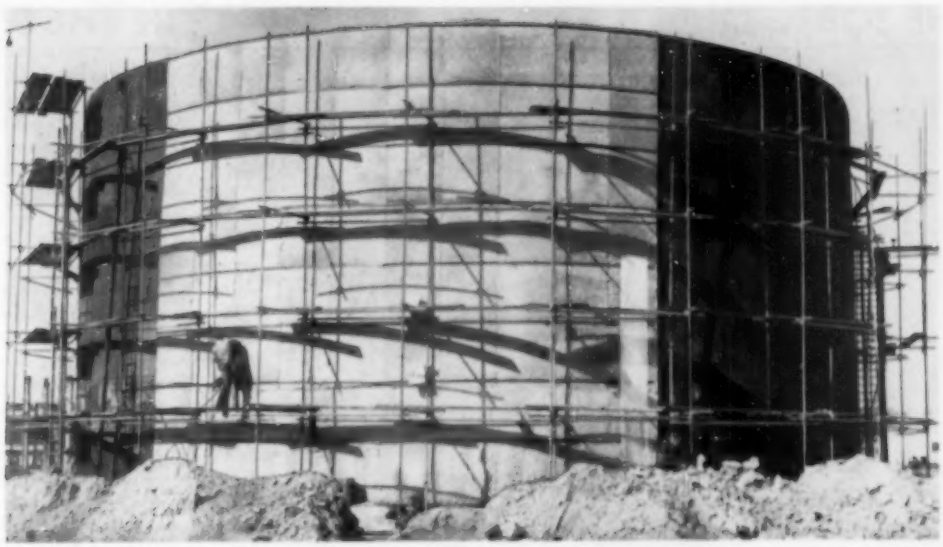
Filter socks . . . The upper section of the reactor serves as a settling zone for the reactant which, in spite of the turbulence, largely settles out and drops to the bottom of the vessel. Fines, meanwhile, are removed from the stream as it passes through the filter socks. These are standard 4-in. filter socks with conventional holes and grooves for aiding the flow of filtrate. The socks are covered with hardware cloth and then a final woven glass cloth. However, the thought is to replace the glass with a stainless-steel-mesh screen.

As the stream passes through the filter cloth, the fines are retained and form a cake on the cloth. Interestingly, the filter aggregate is such that no backwash provisions are necessary to clean the cake off the cloth, for when flow ceases, the cake drops off of its own weight. A factor contributing to a thin filter cake is the length of the tower, which provides enough settling volume that most of the aggregate is not carried to the filter area. Meanwhile, the clean product resulting from the operations does not contain any slime or gummy reaction product which might tend to clog the filters.

Makeup . . . Provisions are available for mixing makeup reactant into a slurry and pumping it into the reactor, with another pump used to withdraw spent reactant from the unit.

The purifier has been operating over a period of time to permit a total of 1.5 million barrels of avgas to pass through it. Life of the reactant has been holding up during these runs, still being active although 5,000 bbl. of avgas has been run per pound of reactant.

The process is licensed by Hoover Processes, Inc., Corpus Christi.



STORAGE TANK at asphalt plant of large midwestern refinery is being insulated by new low-cost method.

Refining Pointers

Low-cost insulation has quick payout

by M. F. Hauserman, Jr.

INSULATION of heavy-stock storage tanks which need to be kept at elevated temperatures will pay out in as little as 4½ months, and will require practically no maintenance. Tank and insulation are protected with a galvanized metal exterior.

A new insulation method which offers these advantages has been devised by Joplin Cement Co. and Gustin-Bacon Manufacturing Co. The method has been proved on application to six tanks in a large midwestern refinery, and the same company is insulating other tanks in other locations by the same method.

Advantages . . . Low cost is the primary advantage—yet there is no sacrifice of thermal efficiency or permanence. The insulation used was exceptionally efficient, indicating a B.t.u. heat loss per square foot of only 0.15 based on 350° F. tank surface temperature and 0° F., outside. Neat appearance results from the use of galvanized corrugated sheet covering.

The greatest single element contributing to the low cost of this job was the ease of applying the lightweight insulation and the large number of square feet covered by using "single piece" wide blankets, cut from long rolls. Dimensional stability, resilience, and tensile-strength properties of the insulation make it possible to install rapidly.

Cost of applying the insulation for these six tanks was $1.05 per sq. ft.

Job description . . . Shoulder studs were welded to the tank, as shown in accompanying picture. Two insulators and one helper quickly applied 48-in. wide glass-fiber insulating blankets. Blankets were cut to the height of the tank, rolled down the tank sides, impaled over the studs, and held in place temporarily with daubs of adhesive.

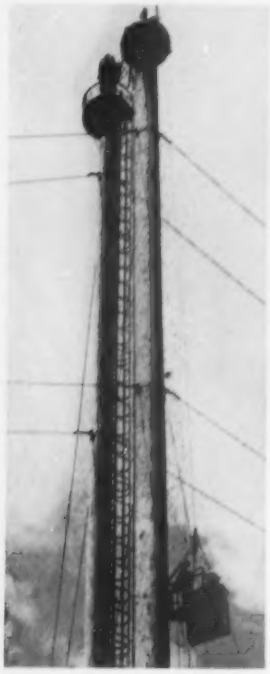
Sheet-metal work followed with the fastening of 1½-in. cold-rolled channel to the studs. This was accomplished by driving the head of the stud through the channel, using a hollow-nosed drift punch. Head of the stud was peened over, holding the channel securely to the stud. Sheet-metal screws secured the corrugated sheets to the channel. Sheet laps were also held together with screws.

Roof . . . Cone roofs of the tanks were insulated and weatherproofed with standard three-ply, 20-year-guarantee builtup roof. Roof insulation was held to tank top with adhesive. Gravel guard flashing keeps gravel on top of tank.

The installations require little or no maintenance.

Author is associated with Gustin-Bacon Mfg. Co., Kansas City.

SIDE VIEW of insulation job shows tank, insulation, supports, studs, and corregated metal covering.



REPAIR CAGE for working on flare stacks is shown above at left. The cage is suspended from top platform of stack and is raised and lowered by air tuggers. In reworking one stack, 2,100-lb. flare tip at right was removed and lowered in the cage.

Planning pays in flare-stack job

IN planning needed repair work on several flare stacks at Esso Standard Oil Co.'s Baton Rouge refinery, heads were put together to work out a better system of doing the job.

Since the three stacks were close together, work could be done on them only when the wind was blowing in the right direction.

Esso boilermakers and riggers devised the cage shown in left photo above. The cage holds three or four men and equipment. It is suspended from the top platform of the flare stack and is raised and lowered by two air tuggers. Load can be lifted by a single air tugger. The second one is provided for safety. A rope sling is used to hold the cage close to the stack at desired elevation.

Since use of this "sky lift" saved much walking up the many rungs on the flare stack ladders, work on the three stacks was completed in record time. The cage had a particular advantage in those frequent cases when the craftsmen had to make hurried descents because of switches in the wind direction, when flames from adjacent flares made it impossible to continue work.

On one job a 500-lb. tip was removed from one flare stack. A cap of comparable size was installed in its place. In reworking another stack, the 2,100-lb. tip (shown at right above) had to be removed and lowered to the ground. This tip was replaced with a lighter tip of special steel construction.

How to turnaround a cat cracker

by J. C. Reed

A TURNAROUND actually begins months before the equipment is shut down when the engineering, mechanical, and operating departments begin making plans to take the unit off stream.

Author is vice president, Procon Inc., Des Plaines, Ill. From paper given at Casper, Wyo., meeting of W.P.R.A.

Preliminary steps . . . One method of preliminary planning that has proved satisfactory is as follows: The plant manager or refinery superintendent, and all of the various department heads hold conferences to schedule and plan the turnaround, estimate the approximate amount of work to be done, the length of time required to complete the entire operation, and to set a date for shutting down the unit. They determine which items of equipment are to be opened, cleaned, and inspected; what major design changes, or plant modifications, if any, are to be made, and discuss all replacements and repair work they know from past experience and current observations will have to be made during the turnaround. The recommendations in the last inspection report are reviewed in order to anticipate additional replacements or repairs that may be found necessary when the equipment is opened and inspected.

All of the information thus obtained from every available source is then compiled and the detailed master work and material lists covering each individual item of equipment are prepared. The work list should show, in order of sequence, all of the known and anticipated work to be done to each item of equipment.

The replacement parts and material on hand in the refinery stock are then checked against the requirements indicated on the work and material lists and all items not in stock are immediately ordered, for in some instances the hard-to-get replacement items must be ordered months in advance to insure delivery before they are needed. In making this check, it must be remembered that regardless of the amount of work or repair to be done to an item of equipment, if it is opened for cleaning and inspecting, a complete set of replacement gaskets and some new bolts may be needed when it is headed up.

When all of the orders for material have been placed and promised delivery dates have been obtained, a definite date is then set to shut down the unit for the turnaround. A few weeks prior to the shutdown date, material deliveries are again checked to confirm the date and an organization is formed, with the duties of the supervisor and each foreman specifically outlined.

Work classification . . . The work is usually divided into classifications somewhat as follows, with a separate foreman assigned to each classification:

1. Reactor and its internal parts.
2. Regenerator and its internal parts.
3. Catalyst-carrying lines and connected piping.

4. Fractionating columns and heat-exchange equipment.
5. Mechanical equipment.
6. Instruments.
7. Electrical system.
8. Changes and additions.
9. Miscellaneous.

Erosion

Erosion is present to some extent in all catalytic cracking units in the paths of the catalyst. The effects of erosion are especially apparent in the reactor and regenerator and the internal equipment in these vessels, including the cyclone separators, grids, structural members and so forth. Erosion is usually found to have occurred in the catalyst-carrying lines, such as the reactor riser and spent-catalyst line, regenerator standpipe and the flue gas line, including the slide valves and expansion joints. The slurry system is another place subject to erosion.

Cyclone erosion . . . The reactor and the regenerator both have cyclone separators to separate the catalyst from the gases, and these separators are always subject to wear. As the catalyst and gases enter the horn of the cyclone they are made to flow in a circular path. The catalyst is thrown to the outside against the wall of the cyclone in a manner that resembles sand blasting.

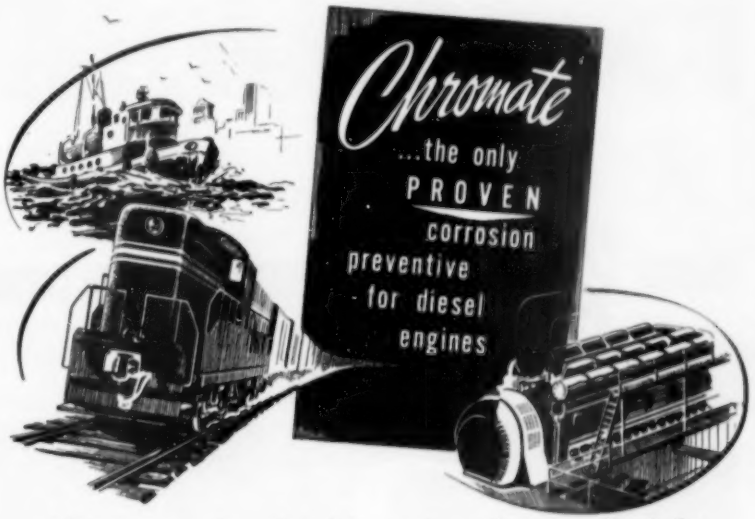
In some cases, replacement cyclones are installed and worn cyclones are put aside to be repaired before the next turnaround, or sections of worn plate are removed and new sections welded into place. Still a third method is to install a high-temperature acid-resistant concrete lining inside the cyclone to cover the worn area. If this lining is used, ¾-in. Hexteel grating is welded to the inside surface of the worn cyclone and filled flush with concrete to the surface of the grating. However, the trend is now away from the use of acid-resistant concrete lining because there is some question as to whether the thickness of this lining causes changes in the efficiency of the cyclone.

Reactor grid plates . . . Erosion of the reactor grid plates and the supporting structural members is caused by the impingement of the catalyst on the underside of the grid as it enters the reactor from the reactor riser. In the case of the supporting members for this grid, metal wear plates are generally added in the spots where the erosion is greatest to take care of future wear. If the grid plates are badly worn, it is generally best to replace them. Enlarged holes in the grid plates can be repaired by reaming and installing steel bushings.

The reactor wall is sometimes subject to corrosion as well as erosion depending on the nature of the charge to the unit. If the vessel wall shows a marked reduction in thickness, a lining is installed, of which two types are being used successfully. One is 11-13 chrome-alloy plate and the other is Lumnite cement and sand concrete which is held in place by ¾ in. 4-6 chrome alloy Hexteel grating welded to the wall.

Seal . . . The light-gage sheet metal seal between the grid and the wall of the regenerator is another point slightly attacked by erosion and it is subject to cracking due to high temperature expansion. On fluid catalytic cracking units of more recent design, a dam has been installed in front of the seal providing a void that will fill with catalyst, thus covering and insulating the seal and also preventing erosion. The insulation lowers the temperature of the seal and cracking is reduced to a minimum. On units not equipped with such a dam, one can easily be installed. If holes or cracks are found in the seal itself, they can be closed by welding or by a patch welded over them

The insulation lining in the regenerator sometimes deteriorates, thus necessitating replacement. This



Chromates are the only tried and true answer to controlling cylinder-liner corrosion in diesel engines. Use of chromium inhibitors is universally accepted by locomotive builders.

Sodium chromate stops corrosion before it starts. The presence of this one chemical renders the metal surface passive to corrosive attack. Slight oxidizing action occurring upon initial contact produces an additional safeguard — a protective surface-deposit of iron and chromium oxides.

Diesel locomotives require only 2000 to 2500 ppm sodium chromate at pH 8.5 to 9.5 to minimize the combined effects of vibration and corrosion. Other units such as standby boilers, stationary and marine diesels, hot water heating systems, and automobile radiators vary in their anti-corrosive requirements from 200 to 5000 ppm sodium chromate. It is important that sufficient chromate concentration be maintained at all times, for to leave valuable equipment unprotected even for short periods may result in serious damage.

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deterioration is most common around nozzles and manholes in the vessel. The deteriorated concrete should be removed back to the vessel wall and new insulating concrete installed either by hand or by the gunite method. Gunite is preferred to the hand method if equipment for installing the lining in this way is available.

Catalyst Lines

The catalyst-carrying lines are subject to erosion, especially the lines carrying catalyst from the regenerator to the reactor and from the reactor back to the regenerator. Any point in these lines where there is turbulence is subject to severe erosion. If the erosion is restricted to a small area, these areas usually are built up to their original thickness by deposits of weld metal. If the area is quite extensive, but not enough to warrant replacing the line, repairs may be made by cutting out the eroded area and installing a plate rolled to the proper contour of the pipe.

Slide valves in these lines controlling the flow of catalyst are naturally subject to erosion and the general procedure for repairing these valves is to remove the valve from the line, build up the body with weld metal where needed, and install new or repaired slides and guides. The slides and guides which are removed can then be repaired at a later date and kept for use during succeeding turnarounds. In building up the body of the valve, it is normal procedure to use mild-steel welding electrodes to replace most of the eroded metal and finish with a special hard surfacing electrode.

Expansion joints . . . These joints in the catalyst lines must be closely inspected for signs of erosion. The expansion joint bellows are made of a thin alloy material corrugated to give flexibility in both the lateral and longitudinal directions. Wear plates are installed inside of joints to protect the corrugation from erosion and to promote streamlined flow through the lines. Eroded wear plates can be repaired by building up the damaged areas with weld metal or, if the erosion is extensive enough to warrant replacing, they can be cut out and replaced.

As a rule, erosion or corrosion is mild to most of the mechanical equipment on fluid catalytic crackers. The one exception is pumps in the slurry system. Damage to the pumps is combated by replacing the eroded metal in the pump case with new weld metal and remachining the pump case to its original dimensions, and replacing the wearing rings, shaft seals, and so forth with new parts.

by J. W. Thompson

REFINER'S NOTEBOOK

Oxidation Stability of Jet Fuels—3

THIS installment explains methods used for accelerated-oxidation tests and presents some results of tests.

Two types of accelerated-oxidation tests were used. In both, 200-ml. samples of fuel were aged at 211.6° F. (±0.2°) under oxygen at 100 psi. in the U.O.P.-type bomb. One of these tests was the accelerated gum procedure outlined in Military Specification MIL-F-5624A, soluble gum being determined by both the air (400° F.) and steam (500° F.) evaporation methods.

The other accelerated test employed the well-known induction-period method, in which the induction period is defined as the time from start of the test until the pressure in the bomb shows a sharp, characteristic drop.[3] (p-Butylaminophenol was used as a standard in calculating the potency ratings of the other compounds.)

Author is with research laboratories, Tennessee Eastman Co., division of Eastman Kodak Co., Kingsport, Tenn.

Accelerated gum method . . . Two

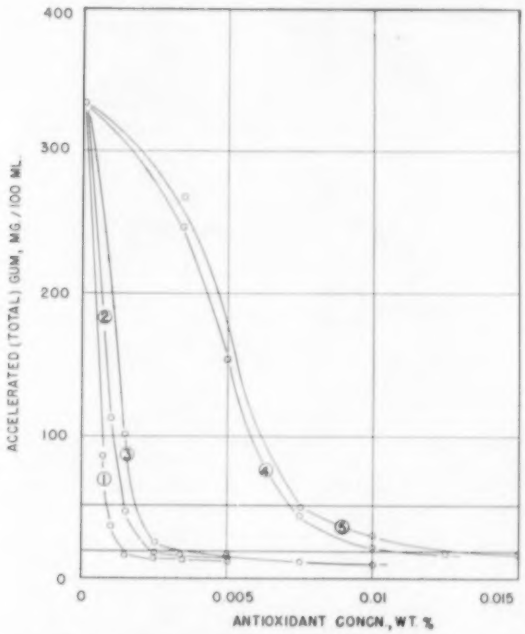

Fig. 1—Antioxidant potency in jet-fuel D by 16-hour gum test (MIL-F-5624A).

Curve: (1) p-butylaminophenol, (2) N,N'-di-sec-butyl-p-phenylenediamine, (3) butylated 4-methoxyphenol, (4) 2,6-di-tert-butyl-p-cresol, (5) 2,2'-methylenebis (6-tert-butyl-p-cresol).

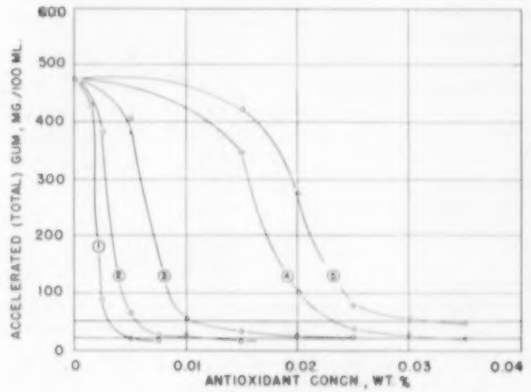

Fig. 2—Antioxidant potency in jet-fuel C by 16-hour gum test (MIL-F-5624A).

Curve: (1) p-butylaminophenol, (2) N,N'-di-sec-butyl-p-phenylenediamine, (3) butylated 4-methoxyphenol, (4) 2,6-di-tert-butyl-p-cresol, (5) 2,2'-methylenebis (6-tert-butyl-p-cresol)

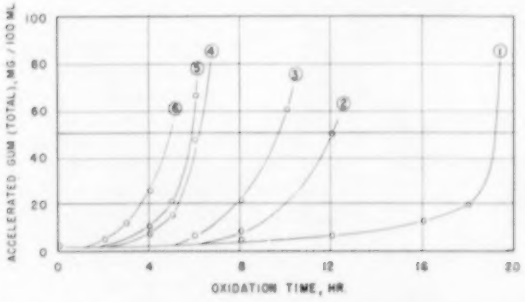

Fig. 3—Antioxidant potency at 0.0033 weight per cent concentration in jet-fuel C by gum time method (accelerated gum by MIL-F-5624A using steam at 500° F.).

Curve: (1) p-butylaminophenol, (2) N,N'-di-sec-butyl-p-phenylenediamine, (3) butylated 4-methoxyphenol, (4) 2,6-di-tert-butyl-p-cresol, (5) 2,2'-methylenebis (6-tert-butyl-p-cresol), (6) control.

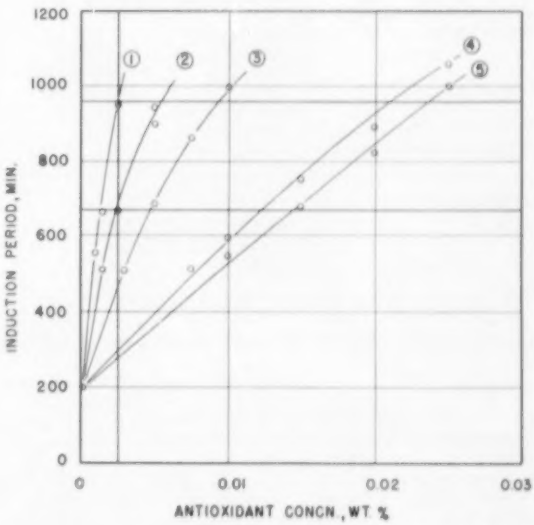

Fig. 4—Antioxidant potency in jet-fuel C by U.O.P. induction period test.

Curve: (1) p-butylaminophenol, (2) N,N'-di-sec-butyl-p-phenylenediamine, (3) butylated 4-methoxyphenol, (4) 2,6-di-tert-butyl-p-cresol, (5) 2,2'-methylenebis (6-tert-butyl-p-cresol).

variations of the accelerated gum method were utilized. In one of these, the 16-hour specification test was applied to the uninhibited fuel and to the fuel containing various concentrations of each antioxidant. The results were used to plot curves of accelerated gum versus antioxidant concentration, as illustrated in Figs. 1 and 2. These curves provided the following information: (1) the acceptability of uninhibited fuels; (2) the concentration of antioxidant required to confer the specified stability to unstable fuels; and (3) a comparison of the antioxidant potencies of the compounds.

"Gum time" can be determined from the curves plotted in Fig. 3. These curves are for the other variation of the accelerated gum method which involves bomb tests for varying times at a fixed antioxidant concentration.

The curves of Fig. 4 are based on the induction-period method. Induction periods were determined at varying antioxidant concentrations, then plotted against concentration to give the curves of Fig. 4.

In the next installment calculation of "inhibitor replacement value" and "inhibitor ratio" for the: (1) gum-vs.-concentration, (2) gum-vs.-time, and (3) induction-period methods will be explained.

TABLE 2—ANTIOXIDANT POTENCY IN JET FUELS BY 16-HOUR ACCELERATED GUM TEST

Antioxidant—Soluble gum method—	Inhibitor replacement values (gum-vs.-concn. method)*: In fuel C (mg. gum) At 20	In fuel C (mg. gum) At 50	In fuel D (mg. gum) At 20	In fuel D (mg. gum) At 50	Average
p-Butylaminophenol:					
Air	1.00	1.00	1.00	1.00	1.00
Steam	1.00	1.00	1.00	1.00	1.00
N,N'-Di-sec-butyl-p-phenylenediamine:					
Air	0.42	0.55	0.61	0.60	0.55
Steam	0.61	0.61	0.58	0.56	0.59
Butylated 4-methoxyphenol:					
Air	0.20	0.30	0.50	0.47	0.37
Steam	0.35	0.30	0.41	0.37	0.36
2,6-Di-tert-butyl-p-cresol:					
Air	0.14	0.13	0.14	0.13	0.14
Steam	0.14	0.12	0.10	0.10	0.12
2,2'-Methylenebis (6-tert-butyl-p-cresol):					
Air	(†)	0.10	0.11	0.12	0.11
Steam	0.11	0.10	0.09	0.09	0.10

*Parts p-butylaminophenol replaced by one part other antioxidant. †Accelerated gum not reduced to 20 mg. level at maximum antioxidant concentration used.

TABLE 3—TYPICAL RESULTS OF ACCELERATED GUM TESTS IN JET FUEL D

Antioxidant—	Accelerated gum (MIL-F-5624A), mg. per 100 ml.*: Antioxidant concn., wt. %	Insoluble gum	Air-jet gum	Steam-jet gum	Total gum (air method)	Total gum (steam method)
None	None	0.3	333	158.5	333.3	158.8
p-Butylaminophenol	0.0010	0.3	36.6	...	36.9	...
	0.0025	0.3	14.4	4.0	14.7	4.3
	0.0033	0.5	12.0	3.6	12.5	4.1
N,N'-Di-sec-butyl-p-phenylenediamine	0.0010	0.3	111.1	38.5	111.4	38.8
	0.0025	0.2	17.4	4.7	17.6	4.9
	0.0033	0.1	14.3	4.6	14.4	4.7
2,6-Di-tert-butyl-p-cresol	0.0033	0.0	247	122	247.0	122.0
	0.0075	0.3	43.6	11.6	43.9	11.9
	0.0125	0.1	17.7	3.2	17.8	3.3
Butylated 4-methoxyphenol	0.0015	0.1	100.3	33.1	100.4	33.2
	0.0025	0.3	22.9	4.9	23.2	5.2
	0.0033	0.0	17.8	6.4	17.8	6.4
2,2'-Methylenebis (6-tert-butyl-p-cresol)	0.0033	0.1	268.0	126.0	268.1	126.1
	0.0075	0.3	48.7	13.5	49.0	13.5
	0.0150		16.8	5.7	16.8	5.7

*Air-jet gum at 400° F.; steam-jet gum at 500° F.

TABLE 4—ANTIOXIDANT POTENCY IN JET-FUEL C BY GUM TIME METHOD*

Antioxidant—	Inhibitor ratio (gum-vs.-time method) vs. p-butylaminophenol: At 20 mg. accel. gum Hours	At 20 mg. accel. gum Ratio	At 50 mg. accel. gum Hours	At 50 mg. accel. gum Ratio	Average ratio
None	3.6	...	4.9	...	...
p-Butylaminophenyl	18.0	1.00	19.1	1.00	1.00
N,N'-Di-sec-butyl-p-phenylenediamine	10.0	0.46	12.0	0.50	0.48
Butylated 4-methoxyphenol	7.8	0.29	9.6	0.33	0.31
2,6-Di-tert-butyl-p-cresol	5.3	0.12	6.1	0.08	0.10
2,2'-Methylenebis (6-tert-butyl-p-cresol)	4.9	0.10	5.8	0.06	0.08

*Soluble gum determined by steam jet at 500° F.

Results of each method . . . The initial gum values on all four fuels are shown in Table 1. Fuels A and B passed the specification 16-hour accelerated gum test as received and were not tested further.

The results of accelerated gum tests on the highly unstable fuel, C, and the moderately unstable fuel, D, are contained in Figs. 1, 2, and 3 and Table 4. The response of these fuels to the antioxidants, as determined by the air method for soluble gum, is shown in Figs. 1 and 2. Curves obtained on these compositions by the steam evaporation method for soluble gum are not shown since they were quite similar to those in Figs. 1 and 2. However, Table 2 shows the potency ratings (inhibitor-replacement values, gum concentration method) of the antioxidants in these fuels by both the air and steam gum methods, based on all the curves obtained.

It will be noted that the inhibitor-replacement values were calculated at two different accelerated gum levels, since the flatness of the curves in the 20-mg. gum region suggested a greater reliability at the 50-mg. level. The individual gum values upon which the curves are based were considered too extensive for inclusion here. However, typical results for some of the compositions in fuel D are shown in Table 3.

The results of accelerated gum versus oxidation time tests (at 0.0033 weight per cent antioxidant) are shown in Fig. 3. The upper portions of Curves 1, 4, and 6 are represented by gum values too high to be shown on the graph. For this type of test, only fuel C and the steam gum method were used. The resulting inhibitor ratios at both 20 and 50-mg. gum levels are contained in Table 4.

Reference

5. Egloff, G., Morrell, J. C., Lowry, C. D., Jr., and Dryer, C. G., Ind. Eng. Chem. 24, 1375 (1932).

Economics of Modern Gas Dehydration—3

by A. H. Weil

EQUIPMENT costs for (1) glycol, (2) solid-desiccant, and (3) expansion-refrigeration plants for natural-gas dehydration were discussed in the preceding installment. Operating costs for the first two types of plant will be dealt with here.

Comparative operating costs... Fig. 2 shows the comparative operating cost for glycol absorption plants and solid-desiccant plants. The refrigeration expansion plant is usually used on the lease as a well-head plant, and the operation cost is usually included with other lease and production expenses. Because this is a minor part of these expenses, it is almost impossible to assign a true operating cost to this type plant.

Our experience indicates (Fig. 2), that the unit cost of dehydration per M.c.f. is a function of plant-load factor. It is, therefore, important in selecting a plant for a given location that it be designed to operate under the highest possible load factor. Since dehydration equipment is non-revenue producing, it is good business and good engineering to limit capital expenditures to only that equipment necessary to do the job.

Limitations in glycol use... As has been demonstrated, both the initial cost and operating expense per M.c.f. of the glycol plants is somewhat less than that of solid-desiccant-type plants. However, the application of glycol dehydration is somewhat limited. For example, for gas which is produced, dehydrated, and transported for ultimate use in latitudes where the temperature of the gas will never be lower than 40°-50° F., the use of glycol is definitely indicated and has proved desirable in the author's own company's experience.

However, for gas which is destined for transportation and consumption in colder latitudes, or where the gas is to be subjected to refrigeration prior to removal of liquefiable hydrocarbons or other types of cold processes, it can be more effectively and economically dehydrated by use of solid desiccants and, is some isolated cases, by use of low-temperature separation equipment.

If, as is generally done, equipment has been selected to operate normally on 70-75 per cent load factor—which makes an allowance for peak-day operation at a 20-25 per cent increased load—then the average cost falls into the ¼-cent per M.c.f. range.

If the load factor becomes 50 per cent and less, then the cost for dehydration increases rather rapidly.

Choosing desiccants... There are several good desiccants available which, when properly "seasoned" and protected from damage by free-liquid water, will give an excellent service life under normal operating conditions. We have found that a combination of activated bauxite-type desiccant and siliceous-type desiccant gives very satisfactory results. This pertains to multibed towers only. For our single-bed towers, the selection is based on the nature of the service to which the bed is to be subjected.

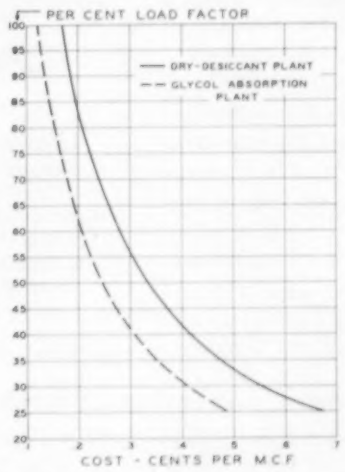

Fig. 2—Typical dehydration-plant operating cost.

Our glycol plants are of the older type and were designed for and still use diethylene glycol. There is probably an advantage in triethylene glycol (because of its lower vapor pressure) if you have a plant designed to utilize this advantage.

Plant Control Equipment

The recording dew-point machine which was developed by the Bureau of Mines has proved extremely valuable in the control of plant operations. It is particularly valuable as a trouble locator, which permits the shortest possible offstream time of a plant when repairs or desiccant replacement are necessary.

By use of this instrument, the plant cycle time may be extended so that full saturation of the desiccant beds can be achieved. This results in fewer regeneration cycles per day of the desiccant material and assures a much longer service life for the drying media, since the life of the desiccant is a function of the number of regenerations to which it is subjected.

The instrument may be used to blend undehydrated gas with the dehydrated gas so that the resultant water content of the blend will meet the required specifications, thereby increasing the capacity of an existing dehydration plant, with the possible saving of additional investment and operating expense of an additional unit.

Author is general superintendent of gasoline department, United Gas Pipe Line Co., Shreveport. Paper presented at thirty-third annual N.G.A.A. meeting, Dallas, 1954.

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The Combustion Gas Turbine in Natural-Gas Transmission—5

by Tracy S. Park, Jr.

THE preceding installment of this series began a discussion of operating costs. Some concluding notes on this topic are given in this final installment on gas-turbine-driven compressors for pipeline service.

Operating labor . . . Tennessee's gas turbine plant in Morehead, Ky., utilizes two men per shift—an operator and an assistant. Actually, one man would be enough because the station is semiautomatic, but for safety and psychological reasons, two men per shift are preferred. A conservative plan therefore indicates a force consisting of eight men, when considering a station comprising from one to about six machines.

Lubricants . . . The reported oil consumption of gas-turbine plants in operation is 1 gal. per 30,000 b.hp. hours, and is considered very good compared with reciprocating compressors with ar oil consumption in the range of 2,500-5,500 b.hp. hours per gallon. This expense is also proportional to the installed horsepower.

Auxiliary power requirements . . . To operate necessary auxiliaries and control equipment, approximately 1 per cent of the rated gas-turbine horsepower is required. Best practice indicates that this auxiliary power be provided by a separate engine-driven generator. Conventional reciprocating-compressor plants normally require from 3 to 4 per cent of installed horsepower to operate auxiliaries.

Maintenance . . . This is the one big factor in turbine-compressor plants that still remains an unknown quantity. The expense includes both labor and material, and may be divided into (1) buildings and structures, (2) compressor machinery, and (3) other equipment. Buildings normally will be smaller and will require less upkeep.

Compressor machinery . . . This applies to the gas turbine (including all auxiliaries furnished by the manufacturer, such as the regenerator, inlet-air filter, water and oil coolers, water and oil pumps, and the electrical or pneumatic control system), and the pipeline centrifugal compressor (including all auxiliaries, furnished by the manufacturer, such as the seal oil system and safety controls). Insufficient operating time does not permit maintenance expense on compressor machinery to be accurately determined.

Other equipment . . . This encompasses all items not included in the above two categories, such as gas scrubbers, all compressor-station piping, gas aftercooling facilities (if installed), water wells, valves, and auxiliary engine-driven generators. This equipment is conventional and maintenance expenses can easily be estimated from past experience.

The only real unknown in the above outline is compressor machinery. The error in estimating over-all maintenance expense can be reduced by accurately determining labor and material expenses for buildings and structures and other equipment, which will be a substantial percentage of the total. Information can then be secured on maintenance expenses for gas turbines and centrifugal compressors that have accumulated considerable operational time in other than pipeline applications. This estimate can be applied conservatively to compressor machinery, and thereby arrive at over-all maintenance expenses for a gas-turbine-driven centrifugal-compressor station.

El Paso Natural Gas Co. has reported that all direct expenses on its gas-turbine plants, excluding fuel, are not expected to exceed one-half of the reciprocating cost of $22.00 per rated horsepower per year. They further report that actual expenses thus far, excluding fuel, are $8.25 per horsepower per year, based on a typical 15,000-hp. station.

Author is mechanical engineer, Tennessee Gas Transmission Co. Paper presented at N.G.A.A. meeting, Dallas, 1954.

Coming Next . . .

1. Quick Check on Fractionating-Tower Diameters. In the next issue, a chart will be presented that will provide a quick and easy check on column size. The chart involves mass-vapor velocity, tower pressure, and temperature and plate spacing.

2. In issues to follow, there will be presented a new series of articles by Sherman L. Cole, Ingersoll-Rand turbo-blower department, which will deal with the effect of gas constants on design and performance of centrifugal compressors.

"One of the biggest contributions a purchaser can make toward assuring receipt of a machine that will satisfactorily do his job is to insure that the turbocompressor is designed for the correct factors."

It is important that the manufacturer of centrifugal compressors have accurate data for these important characteristics of the gas to be handled: (1) molecular weight, (2) supercompressibility factors, (3) "K" value, and (4) specific gravity. These affect the change in density of gas as it is compressed.

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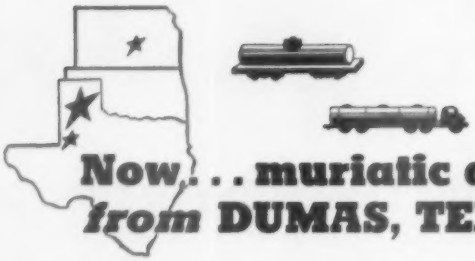

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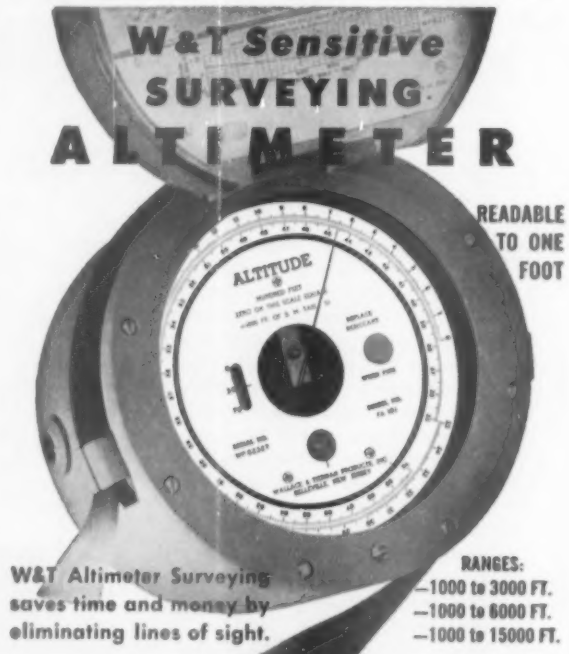

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Equipment and Techniques for Offshore Drilling

by J. N. Pederson

THE equipment used in offshore-drilling operations must be the best available to insure an absolute minimum of costly shutdown time. In the early stages of offshore drilling, the drilling rig cannot be tailored to the specific drilling task, and oftentimes the rig in use will have sufficient capacity for drilling twice the objective depth.

Since many of the offshore prospects are piercement-type salt-dome structures, or deep-seated salt-dome structures with multiple-zone objectives, the objective depths in a particular area may vary from 3,000 to 16,000 ft.

Size of rigs used . . . It is neither practical nor economical to design offshore-drilling platforms to accommodate several sizes of drilling rigs, and the added expense of removing one size of drilling rig from an area to replace it with another prohibits this practice. As a result, large rigs of 800 to 1,400-hp. ratings are being used for most offshore drilling.

Engine capacity for these rigs is often 50 per cent above the drawworks rating, which permits overhaul of engines without rig shutdowns. Sufficient slush-pump capacity is available on the drilling platform for 12,000 to 16,000-ft. drilling and most offshore-drilling units are equipped with an additional 600-hp. pump on the drilling tender for standby or mud-mixing purposes.

Conventional 140-ft. derricks with 30-ft. bases have been used in most offshore drilling operations to date. The average offshore derrick is designed for 1,000,000-lb. load and maximum wind velocities ranging from 125 to 140 m.p.h. Two departures from the conventional 140-ft. derricks are now being used successfully. A twin-rig platform utilizing two 129-ft. derricks with 24-ft. bases was first used in 1949, and this same equipment is drilling from a 10-well platform today. The twin rigs have the economical advantage of being served by one LST tender, and thus far no serious difficulties have resulted from having the rigs drilling side by side.

Another departure from the conventional derrick is the six-well derrick. *(See The Oil and Gas Journal, January 18, 1954.)*

Casing and blowout preventing . . . Casing programs and blowout-preventer equipment are somewhat more elaborate in offshore drilling than in inshore drilling. The casing program for a particular well is determined by the objective depth and the anticipated hole troubles. The various offshore operators have developed casing programs which differ considerably, but these programs in most cases have been adapted to their particular well problems.

One important difference in the offshore-casing program is that a conductor jacket, which is usually 26-in. o.d., must be driven as deep or deeper than the deepest structure-piling to prevent washing out around the structure piling when drilling is commenced. Below this, the string conductor and surface casing are cemented as in inshore drilling. Intermediate protective-casing strings are set in some areas and production-casing strings are generally cemented through the productive zones.

Every precaution is taken to minimize the danger of blowouts, and the blowout-preventer hookups in use in offshore-drilling operations have been carefully selected by the various operators. For moderate-depth drilling, the most widely used hookups consist of two ram-type preventers and one bag-type preventer. For deeper drilling, an additional preventer is often used.

The blowout-preventer equipment is hydraulically operated, but extensions and wheels are normally installed for emergency use. The importance of a reliable pressure source for operating the hydraulic equipment is recognized by all operating companies, and at least two separate pressure sources are tied into the control system. Rig slush pumps, air-operated pumps, hydraulic pumps, and preloaded accumulator bottles or chambers are various pressure sources which are used in combinations.

Storage facilities . . . In order to maintain efficient operations in offshore drilling, considerable advance planning is required, and new methods and equipment have been developed especially for offshore operations. The LST tender at the six-well-derrick platform mentioned above provides storage for materials and equipment, and temporary living quarters for personnel. Storage for 1,400 bbl. of mixed drilling mud, a 7¾ by 18-in. slush pump, and a manifold circulating system installed on the LST permit part or all of this drilling fluid to be included in the drilling-well circulating system.

It also enables mixing of sufficient new mud to replace the existing mud in the circulating system. This feature was used to advantage on another well when it became necessary to replace salt-contaminated drilling mud with a salt-saturated drilling fluid. Dry-storage compartments with capacity for at least a 3-week supply of chemicals and weight materials have been built in; and sufficient casing, drill pipe, and tubing for drilling and completing a well are stored in the LST holds.

A complete cementing unit with permanent bulk-storage bins with capacity for 1,200 sacks of cement is housed on the LST, and an additional 1,600 sacks of cement can be stored on deck in 50-sack-capacity bulk containers. A skid-mounted hoist and control-panel unit which can be used for any of the wireline services is mounted on the drilling platform. The rental rates for maintaining these service units at the offshore locations are easily justified by the value of uninterrupted drilling operations.

Author is with The California Co., New Orleans. From a paper presented at Southwest District meeting, Division of Production, A.P.I., Houston.

by W. L. Nelson
Technical Editor

QUESTIONS ON TECHNOLOGY

Effect of Boiling Range on Pour Point of Diesel Fuels and Distillates

"How is the pour point of a distillate fuel changed when the boiling range is increased? If the end point is increased by 30°, how much does the pour point increase?"—S.P.G.

It is always best to prepare a sample either in the laboratory or by plant operations because pour point is a property that does not behave consistently. Nevertheless, the general effect of boiling range alone is not great for diesel fuels, if the midboiling point of the material is not changed. Thus, the effect of boiling range for a fixed midboiling point is about as shown in Table 1.

TABLE 1—APPROXIMATE CHANGE OF POUR POINT OR FREEZING POINT WITH BOILING RANGE

Boiling range (°F.)	Increase in pour point (°F.)	Pour point or freezing point, relative to that of conventional boiling-range material
Zero (a fraction)	None	
100	1.0	2° F. lower (for diesel fuels)
200	2.3	0.3° F. lower (for diesel fuels)
300	5.0	2° F. higher (for diesel fuels), also 17° F. lower (for jet fuels)
400	22.0	None (for jet fuels)
500	60.0	38° F. higher (for jet fuels)
600	104.0	

The main disclosure of Table 1 is the fact that the inclusion of high-boiling material in a product increases the pour point (or freezing point) far more than the decrease caused by the inclusion of a similar amount of low-boiling material at the other end of the distillation curve. Thus, the net effect of widening the boiling range about a fixed midboiling point is to increase the pour (or freeze) point.

Major Factors

Although the width of boiling range has some effect on the pour point, as indicated above, the real or major factor is the midboiling point of the material and, of course, characterization factor is vitally related to the pour point. This relationship, as shown in Fig. 1, was developed by a study of the hundreds of diesel-fuel samples listed in the "National Annual Diesel Fuel Survey, 1953" (Rept. of Invest. 5008) by O. C. Blade, of the U. S. Bureau of Mines. Chieh Chu, a graduate at University of Tulsa, made the laborious computations necessary in developing the relationship. Although the average deviation of points from the curves of Fig. 1 was only 6.1° F., 15 of the 237 fuels studied had pour points that deviated by more than 15° F. from Fig. 1. The amount of convergence shown at high midboiling points in Fig. 1 is much greater than other sources indicate ("Venezuelan and Other World Crude Oils," Fig. 6, Ministerio de Minas e Hidrocarburos, Caracas, Venezuela). It is believed that the relationship shown here (Fig. 1) is not as dependable as the other source.

TABLE 2—EFFECT OF MIDBOILING POINT ON DIESEL INDEX

Characterization factor	Diesel indexes for these midboiling points—— 420 volumetric (avg. b.p.)	485 volumetric (avg. b.p.)	550 volumetric (avg. b.p.)
11.4	39.5	40.0	41.0
11.5	43.6	44.4	46.2
11.6	47.8	48.9	51.5
11.7	51.9	53.3	56.8
11.8	56.1	57.7	62.1
11.9	60.2	62.2	67.4
12.0	64.3	66.6	72.7
12.1	68.5	71.0	78.0

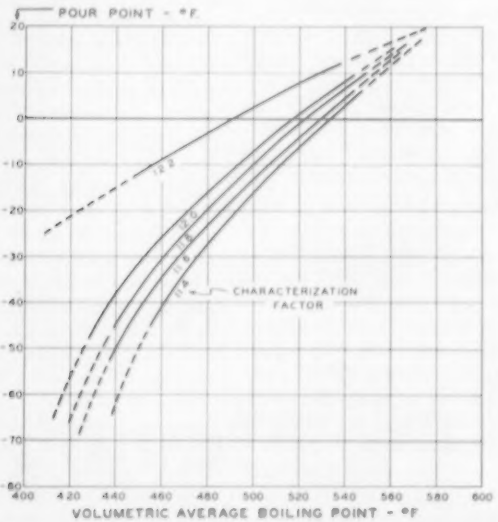
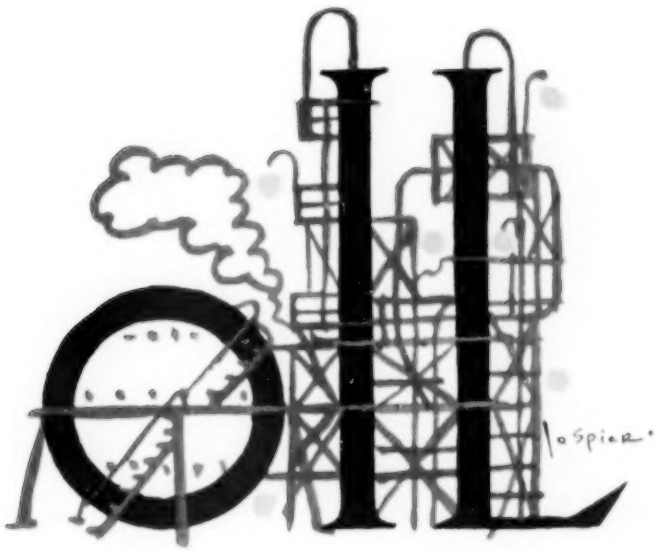


Fig. 1—Approximate relationship between midboiling point, pour point, and characterization factor of commercial diesel fuels.

As a side result, Chu's study indicated that diesel index is a linear function of characterization factor (see Table 2) with low midboiling point fuels having somewhat higher diesel indexes.

These relationships appear to apply to both straightrun and catalytic materials. However, thermal distillates seem to have somewhat lower pour points, and fuels from certain crude oils such as those from the Gulf Coast and Venezuela appear to have abnormally low pour points.



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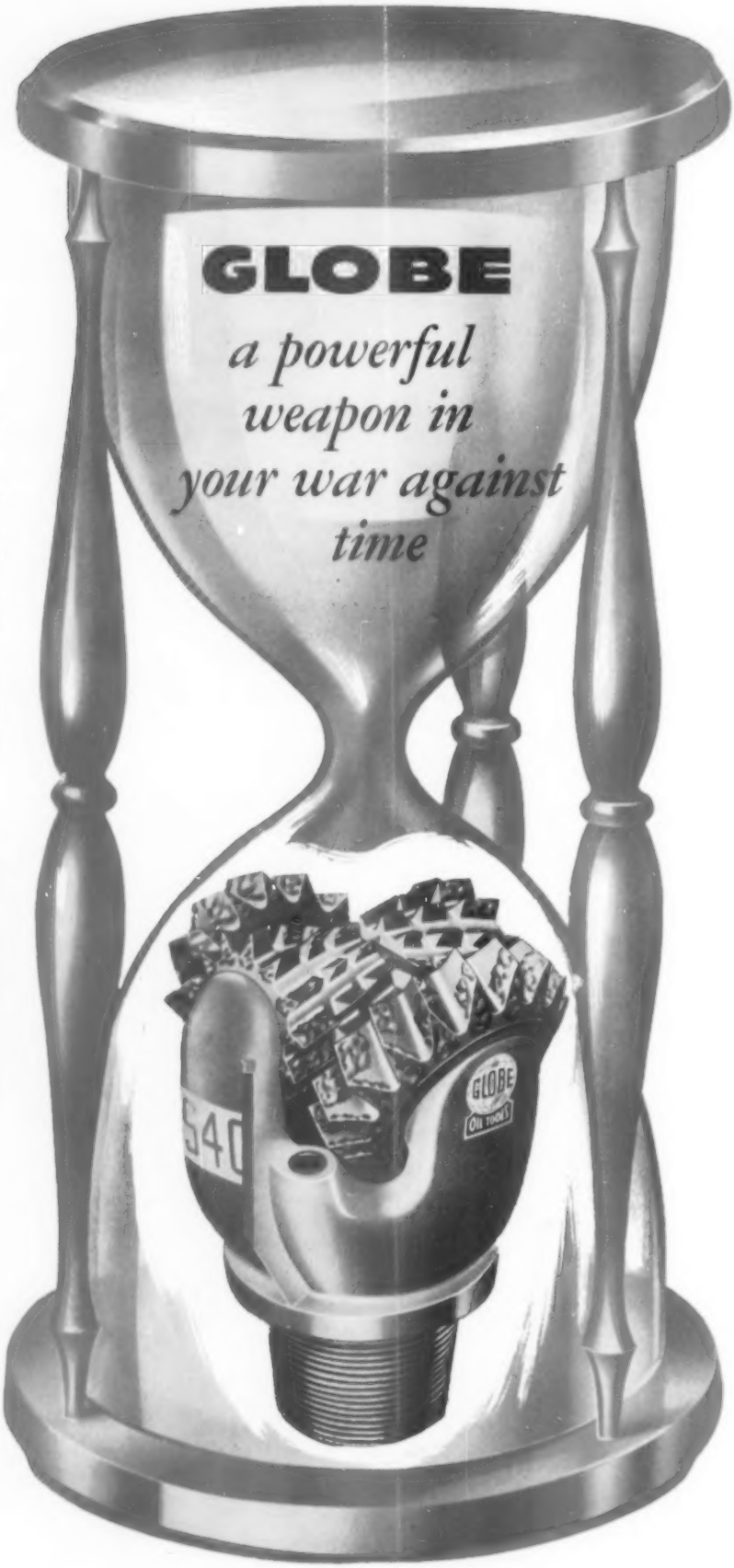

Among the Drilling Contractors

Two Contract Rigs Run In New Louisiana Field

Dixie Drilling Co., Dallas, is joining Bateman Drilling Co., New Orleans, as a contractor for Union Oil Co. of California in the latter's recently discovered Richbend oil field, 40 miles up the Mississippi River from New Orleans, in St. James Parish, Louisiana.

The Dallas contractor will drill Union's third test, 2 Karstien, west offset to the discovery well, completed early in May as a 250-bbl. well in sand at 10,922-44 ft.

Bateman's rig, which drilled the discovery well (1 Karstien), is on Union's second test, 1 Moseley, south offset to the initial producer. At latest report it was nearing contract depth below the pay zone.

New Kansas Drilling Firm

Harms-Burt Drilling Co. is a newly formed contracting partnership operating in Kansas, with headquarters in Great Bend. Partners are Harold A. Burt, of Wichita, formerly regional manager of Natural Gas & Oil Co., and Herbert A. Harms, of Great Bend, previously associated with the firm of Harms & Knight.

Brewster-Bartle Drilling Co., Houston, has contracted with Union Oil Co. of California for an 11,500-ft. test to be drilled in Atchafalaya Bay, off the coast of St. Mary Parish, Louisiana. Location, on State Lease 2349, is nearly 1½ miles off shore.

J. B. Galloway is contractor on a 12,500-ft. wildcat test Tide Water Associated Oil Co. will drill at 1 Guillory, in 44-6s-2e, in southwestern St. Landry Parish, South Louisiana.

McMullen Drilling Co. has a rig working on a wildcat location 1½ miles west of Mount Poso field, northeast of Bakersfield, in Kern County, California, where it is drilling a 3,000-ft. test for Tri-Party Production Corp.

Crow Drilling Co., Inc., Shreveport, has completed a deal with S. Lee Ware, Jr., also of Shreveport, and T. L. James & Co., Inc., Ruston, La., for a 6,000-ft. Wilcox test at a wildcat location 1¾ miles southwest of Clayton, in northern Concordia Parish, eastern Louisiana. Crow will be operator, as well as contractor. The test will be 1 C. T. McGraw & Co., Inc., in 5-8n-9e.

Pioneer Drilling Co. is scheduled to drill a Blossom sand test 5½ miles northwest of Williams, in Red River Parish, northern Louisiana. It is a contract job for Marvin R. LeGrand and R. K. Harrison, of Fouke, Ark. Location is for 1 Harter, in 2-14n-12w.

Calvert Drilling Co. is under contract to Caroline Hunt Trust estate for a 5,200-ft. wildcat test to be drilled at 1 Larson, in 32-150n-70w, 12 miles east of Harvey, in Wells County, North Dakota.

New Drilling Co. has a new wildcat operation under way for Ginther, Warren & Ginther, of Houston, at 1 Small, in 17-9s-62w, 9 miles southeast of Kiowa, in Elbert County, northeastern Colorado. Hole is projected to 7,600 ft. for a test of the Dakota.

C. A. Petrie Drilling Co. is drilling on a projected 9,000-ft. test for Jake Freedman in the La Habra area, near Whittier, in Orange County, California. Location is in 5-3s-10w.

Southern Production Co., Dallas, has contracted for a deep test to be drilled for Pan American Southern Corp. at a wildcat location 2½ miles north of Washington field, St. Landry Parish, southern Louisiana. Location is for 1 Perkins, in 53-4s-4e.

Coates Drilling Co. is scheduled to drill an 8,000-ft. test for Ken Blackford and others at a wildcat location 15 miles northeast of Artesia, in southern Chaves County, New Mexico. The test is listed as 1 Roberts, with spot location in 10-15s-26e.

B & G Drilling Co. is contractor for W. B. Jayred on a new 7,500-ft. test, 2-A State Lease 458, in the Stella area, south of New Orleans, in Plaquemines Parish, Louisiana.

Southwest Workover Co., Corpus Christi, Tex., has taken a contract for a 5,600-ft. test at a wildcat location a mile west of Alice, in Jim Wells County, South Texas. Test will be

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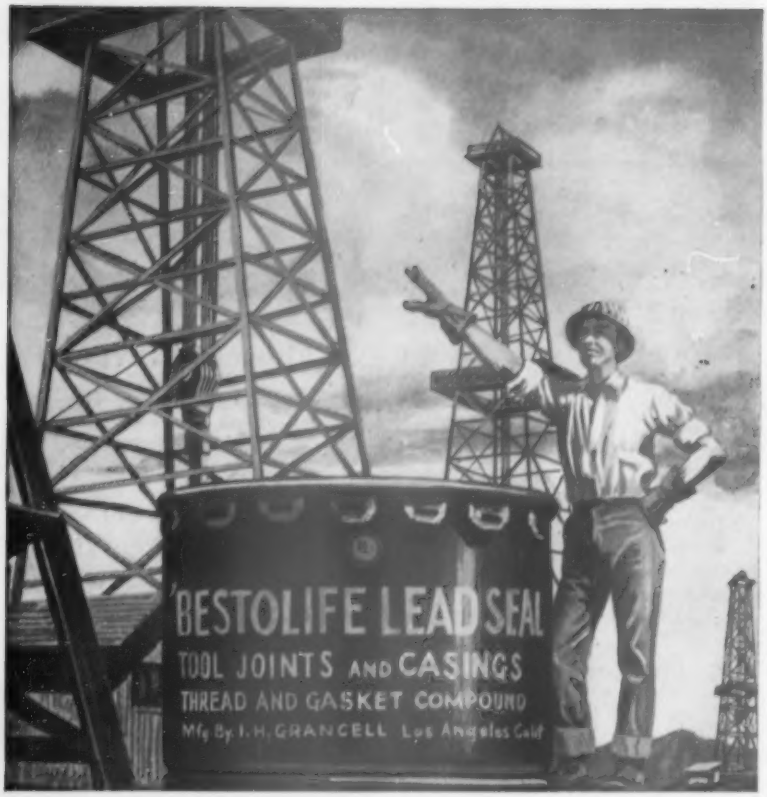

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drilled for Gus Tsesmelis and J. H. Dunn, at 1 Perkins, in the La Vaca Grant. It is 3 miles north of East Alice field, nearest production.

Guy Mabee Drilling Co., Midland, Tex., is under contract for a 13,100-ft. wildcat test to be drilled for Shell Oil Co. in Lea County, New Mexico. Location, 1 Hopper, in 27-19s-35e, is about 6 miles west of production in Monument field.

Pennsylvanian Drilling Co. is contractor on a 3,6000 - ft. wildcat test which Edward E. Kinney has located at 1 Magnolia State, in 32-19s-35e, 2 miles southwest of the East Lusk area, and about 3 miles northwest of the Halfway area, in Lea County, New Mexico.

Ocean Drilling & Exploration Co., Houston, is under contract to Shell Oil Co. for a projected 11,000-ft. test to be drilled in the Gulf of Mexico off the southeastern tip of Plaquemines Parish, Louisiana, in Block 27, South Pass area. It is on States Lease 1011.

Salt Dome Drilling Co., Houston, has been awarded the contract for Sinclair Oil & Gas Co.'s projected 15,000-ft. wildcat test to be drilled in the Timbalier Bay area, of Lafourche Parish. Location of the test, a drilling-barge job, is on State Lease 2490, more than a mile offshore.

Wise Drilling Co., Tyler, Tex., is drilling on a 5,600-ft. wildcat test 2 miles west of Dialville and 9 miles southeast of Neches field, in Cherokee County, East Texas. Contract is with Watburn Oil Co. for 1 Thomason estate, in Thomas C. Arrington Survey.

Grey - Wolf Drilling Co., Houston, will drill a 9,000-ft. test for J. M. Flaitz and R. B. Mitchell, also of Houston, at a wildcat location 2 miles north of Longville field, in Central Beauregard Parish, southern Louisiana. Location is for 1 Long Bell, in 29-5s-9w.

Signal Exploration Co. is moving in drill a 6,500-ft. Mesaverde test for Warren Petroleum Corp. in the Barren Buttes area, 15 miles northwest of Lost Soldier, in Fremont County, Wyoming. Location is for 1 Federal-Brodie, in 31-27n-92w.

McLaughlin Drilling Co. has contracts for two 2,500-ft. wildcat tests to the Devonian to be drilled for Sun Oil Co. in the Rolla area, Rolette County, North Dakota. Location for the first, 1 Wayne, in 20-162n-69w, is 1½ miles southwest of Rolla. The other, 1 Lindbro, is 3 miles northeast of town.

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IF you are all "gummed up" with a tough heat transfer problem, Vogt Scraped Surface Exchangers will provide the answer. They have patented scraper elements which prevent fouling of the heat transfer surfaces and insure the highest rate of heat exchange between the product and the cooling or heating medium. The scrapers also continuously agitate the fluid and assist removal of solids from the unit.

DOUBLE PIPE EQUIPMENT is available in two types; EXCHANGERS, for cooling with water, brine, and cold filtrate, and for heating with steam or hot liquids; and CHILLERS, for use with volatile refrigerants such as ammonia, propane, and Freon. Both types have 8" jacket pipes and 6" inner pipes with scrapers.

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Vogt Scraped Surface Exchangers serve profitably as oil chillers, crystallizers, and heaters in many processes in the petroleum and chemical industries. Their application to your heat transfer problems will receive the prompt attention of our Engineering staff.

Write for Bulletin PE-1

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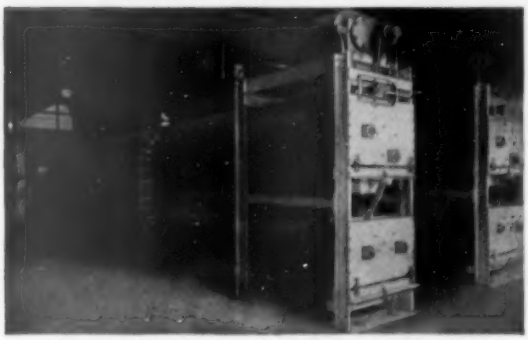

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REFINING

Reformer Finished

Shell puts Platformer on stream at Martinez

MARTINEZ, Calif.—Shell Oil Co. has begun operating the new 5,000-bbl. per day Platformer recently completed at Martinez, Calif., refinery. According to the company, the $1,700,000 plant will boost the rating of feed stock by about 25 research octane numbers.

An interesting development at Martinez is the end use of the hydrogen-rich tail gas produced by the Platformer. This stream, comprising about 5,000,000 cu. ft. of hydrogen per day, will be moved to the nearby Pittsburg plant of Shell Chemical Corp. where it will be converted to synthetic anhydrous ammonia.

Shell Chemical was recently granted a rapid tax amortization certificate for 45 per cent of $371,000 to expand the Pittsburg ammonia operation. To date the only other ammonia synthesis from catalytic reforming hydrogen is the 100-ton per day plant now being placed on stream at Philadelphia by Atlantic Refining Co.

Clark Awards Platformer Contract to Procon, Inc.

BLUE ISLAND, Ill.—Procon, Inc., has been awarded the contract to build a 5,500-bbl. Platformer at Clark Oil & Refining Corp.'s refinery here.

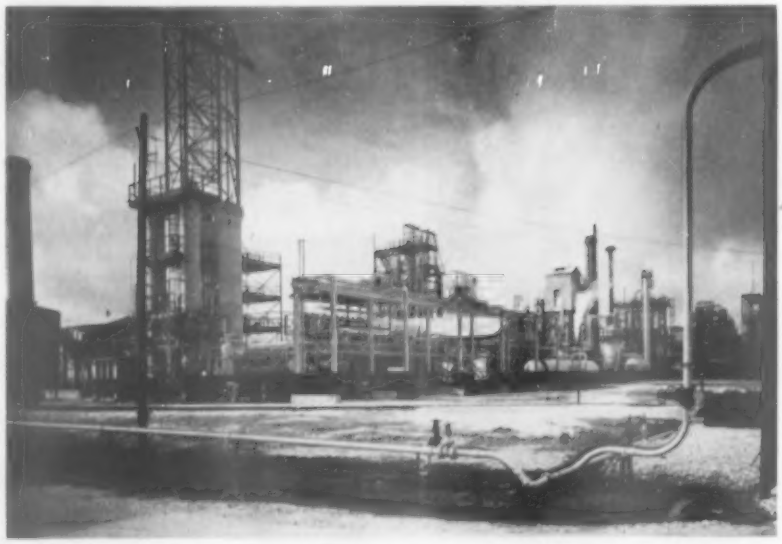
The unit, licensed by Procon's parent company, Universal Oil Products Co., is scheduled for completion in the fall, at which time the company will raise its single gasoline grade to a 93 research octane rating.

The 20,000-bbl. per day refinery, located south of Chicago, completed a 7,500-bbl. per day Houdriflow catalytic cracking unit several months ago.

Mid-West Completes Refinery Expansion

GRAND RAPIDS. — Mid-West Refineries, Inc., has completed an expansion program at the company's Alma, Mich., refinery.

Crude capacity was boosted from 4,200 to 10,000 bbl. per day and thermal cracking capacity was raised 1,600 bbl. to 3,600 bbl. daily. The company's 1,500-bbl. Platformer was also expanded to 2,500 bbl. per day.



Gulf's Iso-Octyl Alcohol Plant Now on Stream

Gulf Oil Corp. using a successfully modified development of the Oxo process introduced by the Germans during World War II has put on stream this iso-octyl alcohol plant at Port Arthur, Tex. The plant has a capacity of 9,000,000 lb. a year and can be adapted to produce other alcohols. The first stage of the process utilizes heat, petroleum hydrocarbons, carbon monoxide, hydrogen, and a metal catalyst to produce octyl aldehydes. The aldehydes produced are then purified in a second stage before being converted to iso-octyl alcohol. In the final stage the alcohol is further purified by fractionating to remove small amounts of contaminants.

How Exon 402-A wipes out corrosion

ACIDS ate through every metal tried

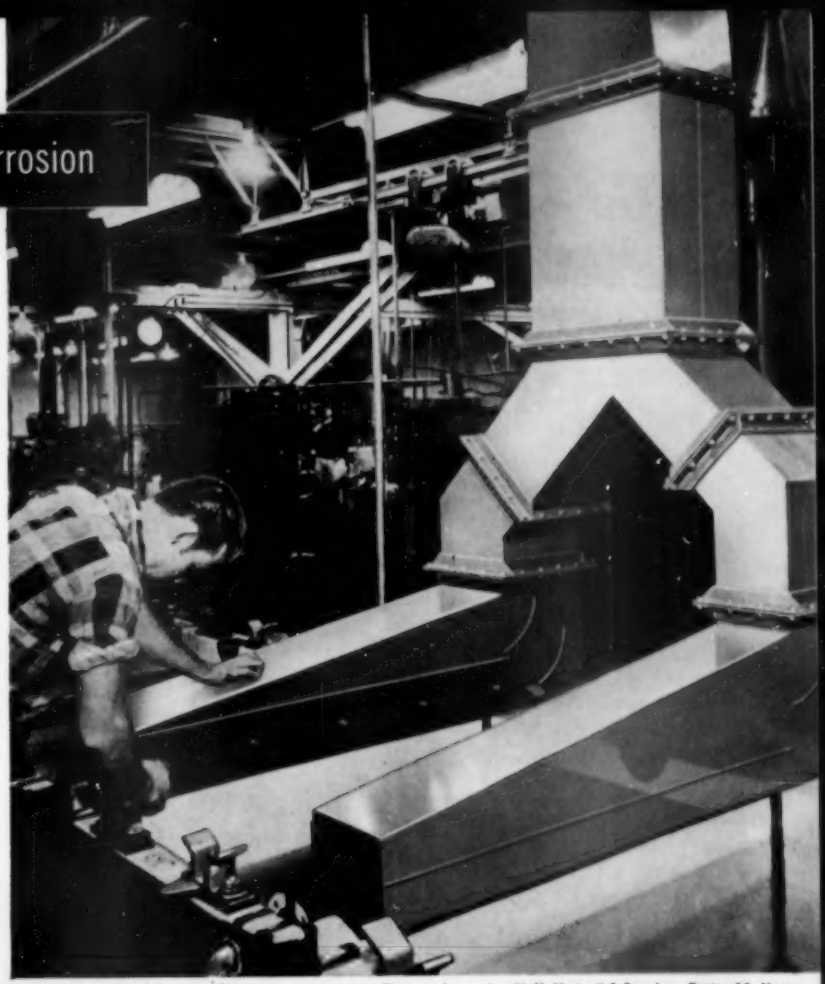
...but could not affect Boltaron 6200

The toughest, most corrosion-resistant metals used failed to hold electro-plating acid fumes at Cannon Electric Company, Los Angeles.

In 2 months, the solution of 33% nitric, 33% sulfuric acid, and 33% fluoride salts destroyed ducts and tanks.

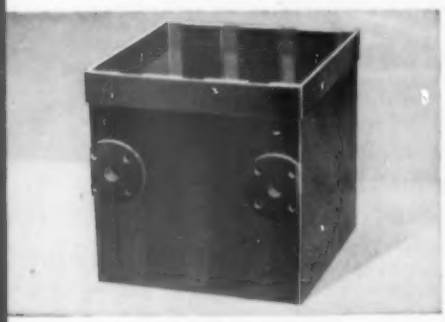
In June, 1953, Plant Engineer Byron Hill installed a completely new ducting system of Boltaron 6200.

It has been in continuous operation ever since. Its present condition is utterly unmarked. Maintenance costs have been wiped out.



Installation by Horace Blackman Co.

Photographs courtesy H. N. Hartwell & Son, Inc., Boston 16, Mass.



★ Eastman Kodak Co., Rochester, reports that Boltaron 6200 remained completely uncorroded by ferricyanide after 3 years, when no other material lasted 3 months.

Installation by Industrial Plastic Fabricators, Inc.

★ A switch to Boltaron 6200 copper-plating rings wiped out corrosion in this equipment at Norris-Thermador Co., Los Angeles. Extremely close tolerances were maintained.

Installation by Horace Blackman Co.

★ For 18 months, sulfuric acid fumes have failed to corrode a Boltaron fume removal system at Electric Storage Battery Company, Fairfield, Conn.

New rigid, extremely versatile, light weight materials are making corrosion a memory in industry all over America. These unplasticized polyvinyl chlorides are typified by Boltaron 6200.

Firestone's Exon 402-A resin meets Boltaron's exacting specifications —best assurance of uniform results under the most corrosive conditions.

These materials can be welded, sawed, sheared, stamped, milled, molded, planed, drilled, embossed, rolled and cemented—on conventional woodworking or metalworking equipment.

For details that will interest you in particular, call or write:

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NOTE: Firestone supplies the resin only, does not manufacture the end product.

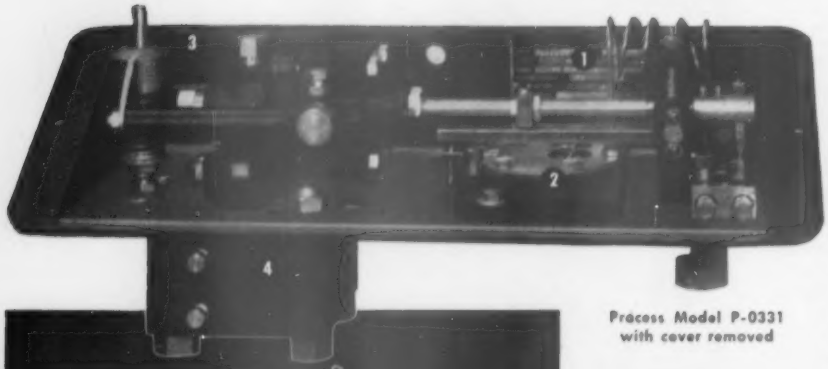
PROCESS CHANGES CAN'T OBSOLETE THIS TRANSMITTER . . .

❶ 10-1 RANGE CHANGE —NO CHANGE OF PARTS

Double weighbeam construction on many models permits range changes as much as 10-1, just by turning a set of locking nuts to change a fulcrum point.

❷ ADDITIONAL 16-1 RANGE CHANGE—STILL NO PARTS CHANGE

Range may be changed on all models by loosening retaining bolts and sliding the reaction chamber to a new leverage position. Reaction area may be changed for further range change.

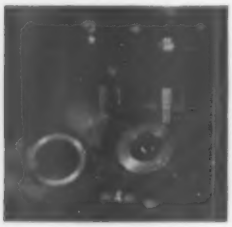


Process Model P-0331 with cover removed

❸ SUPPRESS, COMPOUND OR REVERSE RANGES

Balancing spring, installed to exert either an upward or downward force on transmitter weighbeam, quickly converts transmitter for range suppressions up to 80% of total range, for reversed ranges or for compound ranges where pressure fluctuates above and below atmospheric pressure.

REPUBLIC PNEUMATIC TRANSMITTER with EASY RANGE CHANGE



❹ MAJOR RANGE CHANGES

Range change plates may be easily inserted or removed from measuring chamber to change the effective diaphragm area for major range changes. Similar plates may be used also in the reaction chamber for further range change.

Here's the pneumatic transmitter for measuring differential, flow, pressure or level that saves you time and money when operating conditions are not definitely known or processes are likely to be changed. Extreme flexibility of design lets you adapt the same transmitter chassis for almost any range of measurements—often without any change of parts.

Process Model pictured above has a differential range of 0-12″ H_2O minimum and 0-880″ H_2O maximum at operating pressures to 1500 psig. Other models are available for differential ranges as low as 0-0.6 H_2O or as high as 0-750 psi.

Transmitters may be constructed of special materials to handle almost all types of corrosive fluids. Ruggedly built, they give long service out-of-doors. Accuracy is guaranteed at ½% of full range on standard models.

Republic transmitters are used in process, chemical and petroleum plants all over the country. Investigate their advantages for your plant.

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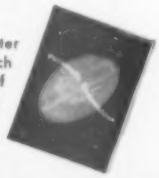
Get the full story about Republic transmitter flexibility. Send for free Data Book which gives all the facts about complete line of Republic transmitters, including Square Root Extracting and Pneumatic Electric models.



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Refining Briefs

NEW YORK.—A manual on evaporation losses is being planned by the American Petroleum Institute. The newly formed evaporation loss committee said the manual would be ready in the not-too-distant future.

NEW YORK.—A tentative specification for centrifugal pumps for general refinery services has been issued by the American Petroleum Institute. The publication is designated as A.P.I. Standard 610 and is designed to simplify the purchase of these items of equipment.

NEW YORK.—A fifth installment of the American Petroleum Institute's manual of recommended practices for refinery inspections is now available for distribution. The installment is Part V of the manual and covers inspection of instruments.

Petrochemicals

Aid to Paint

C-Oil may rule out use of linseed, tung oils

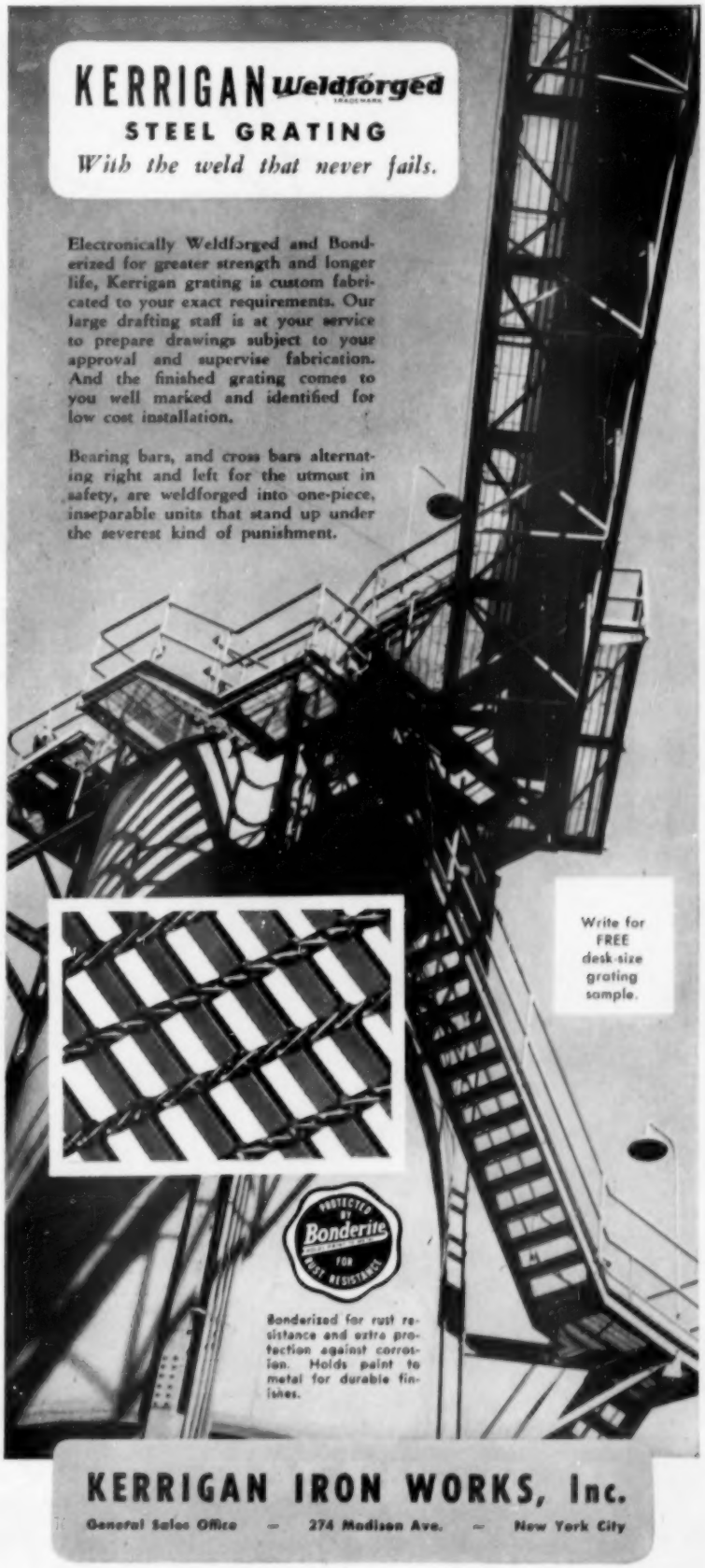
NEW YORK.—A new polymer of butadiene, called C-Oil, has been developed by Standard Oil Development Co.

The new petrochemical is a heavy-bodied, sticky, almost colorless material and is expected to enable companies to produce a new line of protective coatings and plastics.

Standard Development, which spent 7 years experimenting to find C-Oil's potential uses, has licensed Glidden Co. to develop surface coating uses for the first commercial application of the product. C-Oil presently is being made in semicommercial quantities at the Esso Laboratories, Baton Rouge, but will not reach the market for several months.

Standard Development reports that C-Oil enamel has resisted damage from 5 years submergence in harsh chemical solvents and has shown a resistance to alkali, dilute acid, and water. If future developments are successful, Standard predicts that C-Oil will relieve paint manufacturers from dependence on linseed, soya, tung, and other natural oils.

C-Oil also forms a glass-like plastic which can be machined and has unusual electrical properties which indicate it will have a great future in high-frequency electrical equipment.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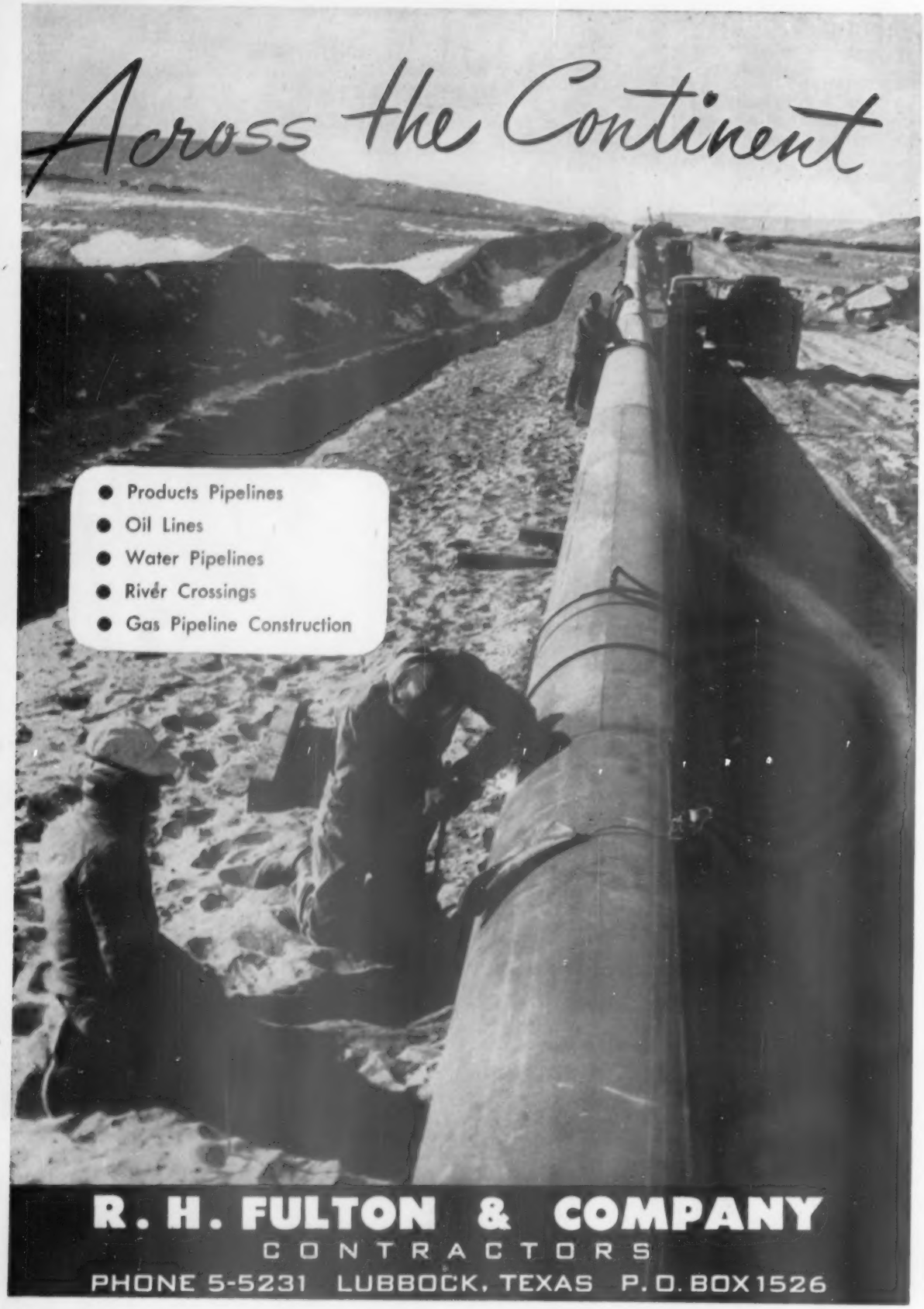
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Pipeline Patrol

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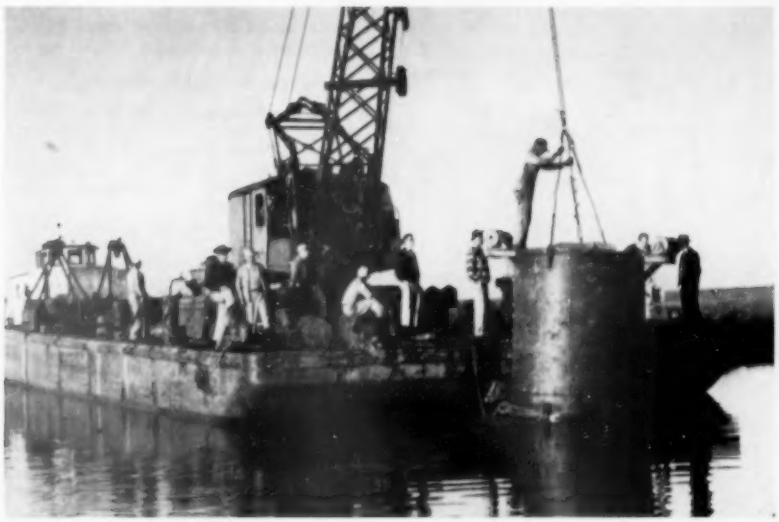

Portable bell hole for underwater pipelining

A "PORTABLE bell hole" has been devised and built for marine and offshore pipeline operations by Brown and Root, Inc., Houston. This provides a dry place below the surface of water where operations can be carried on for making repairs, etc.

The portable bell hole is a big tube made in two halves which split longitudinally and have an opening for the pipe. After this tube has been broken in half it can be fitted around the pipe and clamped back together. The water is then pumped out.

The pipeline definition for bell hole is "a hole dug under or adjacent to a line to permit a welder to work on the lower segment of pipe in a ditch." The name of the portable bell hole promises to join the misleading terms in the pipeline nomenclature such as big-inch, stove pipe, and skyhook.

Under Way, Contracted, and Planned . . .

PIPELINE activity as reported below by The Oil and Gas Journal is compiled from information received from pipeline companies and contracting firms.

These projects include those planned, proposed, under way, and contracted. Uncontracted projects are indicated by a • preceding the job.

Crude-Oil Pipelines

Atlantic Pipe Line Co.—Moore Construction Co., building 40-mile, 8-in. loop of present line from Andrews to Midland, Tex. Job scheduled to finish in July.

• **California - Oregon Pipe Line System**—103 miles 6-in., proposed, Crescent City, Calif., to Medford, Ore.

• **Cities Service Pipe Line Co.**—60 miles, 12-in., Sour Lake, Tex., to Houston, Tex. O. R. Burden Const. Co. Completion set for July 15, 1954.

Interstate Oil Pipe Line Co.—River Construction Co. has contract to build 25 miles of 8 and 12-in. line from Little Lake oil field in Jefferson Parish, La., to Grand Isle on the Gulf of Mexico.

• **Magnolia Pipe Line Co.**—208-mile, 20-in. crude line under way from Corsicana to Magnolia's refinery at Beaumont, Tex. H. B. Zachry, Const.

• **NNCW Pipeline Co.**—127-mile line, proposed, from Weston County, Wyoming to Casper. 108 miles of 10-in. and 19 miles of 8-in. Est. Cost: $3,500,000.

• **Orchard Pipe Line Co.**—45-miles, 8-in., proposed to transport crude from Masters field in Logan County, Colorado, to point 4 miles northwest of Orchard. Estimated cost: $811,250.

• **Pawnee Pipe Line Co.**—35 miles of 10, 8, and 6-in. line approved from Adena field in Colorado to Merino, Colo.

• **Sinclair Pipe Line Co.**—20 miles, 12-16-in., planned, Monee to Blue Island, Ill. 16-in. completed. 14 miles of 12-in. awarded to Morrison Const. Co. Est. completion July.

Trans Mountain Oil Pipe Line Co.—Company has awarded contract to Engineers Limited Pipeline Co. to build 15 miles of 20-in. and 11 miles of 16-in. line. Both lines run

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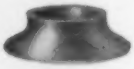

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PIPE LINE SURVEYS

Pipeline Patrol

from Sumas, B. C., to General Petroleum's refinery which is being built at Ferndale, Wash.

• **Union Oil Co. of California.**—Planning construction of a 60-mile crude line from its Clara Valley field to its Wilmington refinery. Line is expected to be completed by late this year. Size not yet determined. Engineering work under way.

• **West Coast Pipeline Co.**—960 miles, 24-26-in., planned. Wink, Tex., to Norwalk, Calif. $106,000,000.

Products Pipelines

American Pipe Line Co.—Has received ODM approval to amortize 40 per cent of $178,000,000 with a rapid writeoff on proposed line to run from Gulf Coast area to New York City area.

Badger Pipe Line Co.—195 miles, 10-12-in., July '54, East Chicago, Ind., to Madison, Wis. (Joint project of Cities Service Oil Co., Sinclair Pipe Line Co., Pure Oil Co., and The Texas C.).

• **H. W. Bass & Sons, Inc.**—152 miles, 4-6-in., proposed. Duval and Live Oak counties, Texas, to Corpus Christi, Tex.

Great Lakes Pipe Line Co.—Under way extension 130 miles, 8-in., Nebraska City to Grand Island, Neb. R. H. Fulton Const. Co.

127 miles, 8-in., to run from Iowa City, Iowa, to Prophetstown, Ill., and to tie in to the Badger system there. M. R. Co. and Mid-States Construct. Co.

• 188 miles of 12-in. to run from Kansas City to Des Moines. Midwestern Constructors, 48 miles R. H. Fulton & Co., 71 miles, and M. R. Co., 69 miles.

• 98 miles of 12-in. from Rosemount to Willmar, Minn.

• 63 miles of 12-in. from Willmar to Alexandria, Minn.

105 miles of 8-in. from Alexandria to Fargo, N. D. R. H. Fulton & Co.

Harbor Products System.—86 miles of 16-in. underway from Woodbury Junction to Tremley Point, N. J. Pipeline Construction & Drilling Co. is doing the work and completion is not definite because of right-of-way difficulties.

• **International Pipe Line, Inc.**—132 miles, 8-in., proposed, Wrenshall to Minneapolis, Minn.

Phillips Pipe Line Co.—71 miles of 8-in. now out for bids. Company expects line to be completed in September.

Shell Pipe Line Corp.—65 miles of 12-in. products line from Baton Rouge, La., to Shell's Norco refinery. Houston Contracting Co. has contract. H. T. Muckley, Supt.

• **Sunflower Pipe Line System.**—Company proposes to build a 215-mile, 6-in. line to transport LPG from six counties in western Kansas to Wichita. Kansas Corporation Commission will hear application on July 19 and 20.

U. S. Gov't. Alaskan Products Pipe Line.—600 miles, 8-in., under way, Haines northward through British Columbia and Yukon to Fairbanks, Alaska. Williams Bros., McLaughlin, Inc., and Marweil Const. Co. Completion date 9-55.

Wyoming-Nebraska Pipeline Co.—Houston Contracting Co. has general contract to build 220 miles of 6-in. line from Frontier Oil Co.'s refinery at Cheyenne to North Platte, Nebraska. Work expected to be completed by October 1954.

Yellowstone Pipe Line Co.—(Continental Oil Co., Interstate Oil Pipe Line Co., Union Oil Co., and H. Earl Clack interest) 531 miles, 10-in., under way, Billings, Mont., to Spokane, Wash. 9-54. Est. cost: $20,500,000.

Billings to Bozeman, Mont. Ross and Powers, Comp. 133 miles, 8-31-54.

Bozeman to Helena and on to Clinton, Mont. Associated Pipe Line Contractors, Inc. Completed. 94 miles 6-15-54.

Helena to Clinton Mont. Associated Pipe Line Contractors, Inc. 69 miles 8-31-54.

Clinton to Perma, Mont. Eastern Pipe Line Fields Service Co. 76 miles. Completed.

Perma, Mont., to Murray, Idaho. Eastern Pipe Line Field Service Co. 74 miles 7-1-54.

Murray, Idaho to Spokane, Wash. Engrs. Limited Pipe Line Co. 85 miles 7-1-54.

Natural-Gas Pipelines

• **American-Louisiana Pipe Line Co.**—1,121 miles of 30 and 22-in., 30-in., proposed, extends from North Tepetate, Acadia Parish, Louisiana, to near Detroit. The 22-in. starts near Payne, Ohio, extends to Bridgman, Mich. Estimated cost: $130,000,000.

• **Arkansas Louisiana Gas Co.**—108 miles of new line proposed, to be added to present system in Arkansas, Louisiana, and Texas. Estimated cost: $9,245,166.

• **Atlantic Seaboard and Virginia Gas Transmission.**—116 miles, 26-in., proposed, loops along Cobb, W. Va., to near Baltimore, Md. Started May 1.

• **Carolina Natural Gas Corp.**—185 miles, 2-12-in., proposed, lateral lines off Transcontinental in North and South Carolina.

• **Central Hudson Gas & Electric Corp.**—Company has filed application with FPC to construct 48 miles of 12-in. line from Albany to Kingston, N. Y. Line will be started and completed in 1955 if FPC approves.

Chicago District Pipe Line Co.—19 miles of 36 and 30-in., completed of 35 miles planned. Remainder, all 30-in., will be completed in 1954.

• **Cities Service Gas Co.**—24 miles of 26-in. proposed, to replace two existing 16-in. lines in Franklin and Johnson counties, Kansas.

Nine miles of 20-in. to replace existing 16-in. line in Cherokee and Jasper counties, Missouri.

• **City of Dalton, Ga.**—Proposes to build 39 miles of 8-in. from a point of interconnection with Southern Natural's Rome-Calhoun transmission line. Estimated cost: $2,940,000.

• **City of Fayette, Ala.**—20 miles, 5-in., FPC approved, Fayette, Ala., to Southern Natural's system in Tuscaloosa County, Alabama. Completion set for early 1955.

City of Dallas, Ga.—56 miles of 8 and 4½-in., distribution system. Engineering & Const. Co. Completion June 1954.

• **Coast Counties Gas & Electric Co.**—40 miles, 3, 4, and 8-in., planned. Coast and Valley region, California.

• **Colorado Interstate Gas Co.**—365 miles, 22-in., proposed, Green River, Wyo., to Denver, Colo. 1954.

49 miles, 20-in., under way, Morton County, Kansas, to near Hooker, Okla. Estimated cost: $3,999,000. R. H. Fulton Const. Co.

• **Colorado-Western Pipe Line Co.**—454 miles of undetermined size pipe planned between Cortez in Montezuma County and Denver. Line would serve towns of Montrose, Gunnison, Salida, Fairplay and South Platte, Colo. Estimated cost: $30,000,000. Company also plans 254 miles of laterals to service Colorado cities not now receiving natural gas.

328-mile line, proposed, to run from a point in La Plata County in southwestern Colorado over the Continental Divide along the eastern slope to serve Pueblo, Colorado Springs, and Denver. Estimated cost: $21,600,000.

• **Dixie Pipe Line Co.**—Proposed 20-mile, 8-in., line from Gwinville field to connection with Transcontinental Gas Pipe Line Corp.'s existing transmission line in Jefferson Davis County, Mississippi. Est. cost: $425,000.

• **Fort Worth Basin Gas Co.**—Planned,

Pipeline Patrol

Novice, through Brown and Comanche counties, Texas.

• **Glacier Gas Co.**—285 miles, 20-in., proposed, Kalispell, Mont., to Spokane, Wash.

120 miles, 16-in., proposed, Spokane to Hanford, Wash.

91 miles, 8⅝-in., proposed, Spokane to Lewiston, Idaho.

130 miles, 12¾-in., proposed, Spokane to International boundary at Trail, British Columbia.

Gulf Interstate Gas Co.—860 miles, 30-in., under way. Acadia Parish, La., to Boyd County, Ky. H. C. Price and Houston Contracting. 11-54.

Houston Contracting Co., Ltd., has completed 370 miles of its 500-mile contract from Rayne, La., to Kinkade, Tenn. Three spreads which have been working on the job are presently overhauling equipment and will not resume work until spring. Spread 1, headed by E. C. Norris, has completed 165 miles from the Mississippi River northward and it will resume work this spring.

Spread 2, headed by F. A. Silar, has completed 117 miles from the Ouachita River southward into the inception point of Rayne.

Spread 3, headed by M. L. Thompson, has completed 88 miles from the Ouachita River northward to the Mississippi River. It will begin work in the spring at the terminus of Kinkade, going south to join with Spread 1.

The remaining 346 miles is under contract to H. C. Price Co., Bartlesville, Okla. The firm has completed 276 miles and has 70 miles remaining which will be started in the spring. Three spreads, headed by G. A. Reutzel, R. L. Ezell, and W. H. Olrich, have done the work. Price's contract covered the line between Gordonsburg, Tenn., and Catlettsburg, Ky.

Under way, Rayne, La., to Kincade, Tenn. Houston Contr. 370 miles laid. 130 miles left to be finished Spring of 1954.

Under way, Gordonsburg, Tenn., to Catlettsburg, Ky. 266 miles completed, 91 miles left.

230 miles, gathering lines, under way. Associated Pipe Line Contractors, Anderson Bros., Williams Bros.

329 miles, 12 to 24-in., proposed. Laterals off Acadia Parish, Louisiana, to Boyd County, Kentucky, line.

• **Home Gas Co.**—Asking for bids on 24 miles of 12-in. from Halsey Valley to Westover, N. Y.

Also asking for bids on 25 miles of 12-in. from Port Dickinson to Deposit, N. Y.

• **Hope Natural Gas Co.**—Proposing to build a 22½-mile extension of existing line from Boone County, West Virginia, to Logan-Mingo County Line, W. Va. Est. Cost: $930,000.

• **Houston Texas Gas & Oil Co.**—Company proposes to build two natural gas lines. One line would run from lower Rio Grande Valley to Chicago. The other line would go from southern Louisiana to New York City. Engineering firm reported preparing an economic report on the lines at present.

Iroquois Gas Corp. and Tennessee Gas Transmission Co.—Companies planning joint storage project to be known as Colden storage field in New York. The following delivery and gathering lines are planned:

17 miles, 16-in. delivery line.

62 miles, 12, 8, 6, and 4-in. gathering lines.

• **Iroquois Gas Corp.**—25 miles of 20-in. line, approved by FPC, from Iroquois' Porterville station near Elma, N. Y., to Tonawanda, N. Y. Est. cost: $1,540,000.

Kansas-Nebraska Natural Gas Co., Inc.—Proposes to construct 206 miles of 6-12-in. pipeline to add to present system in central and northeastern Nebraska.

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• **Lateral Gas Pipe Line Co.**—27 miles, 4½ in., proposed, from Grant to Clarinda, Ia. Estimated cost: $267,200.

• **Manufacturers Gas Light & Heat Co.**—40 miles, proposed, Allegheny, Washington, and Beaver counties, Pennsylvania.

213 miles, 3 to 26-in., proposed, various points on system in Pennsylvania, West Virginia, and Ohio.

72 miles, 16-20-in., proposed, Doddridge, Wetzel and Marshall counties, West Virginia.

• **Michigan Consolidated Gas Co.**—25 miles, 12-in., proposed, from near Sparta to Muskegon, Mich.

• **Michigan Wisconsin Pipe Line Co.**—251 miles, proposed, 24, 18, 12, 6, and 4-in. loops. Majority will be in Wisconsin.

Missouri Central Gas Co.—25 miles, 6-in., proposed, Moberly to Macon, Mo.

• **Missouri Public Service Co.**—136 miles, 8-10-in., proposed, New Franklin to Trenton, Mo.

24 miles, 10-in., Johnson County to Clinton, Mo. FPC approved. Est. cost: $600,000.

• **Montana-Dakota Utilities Co.**—Proposes to build 56 miles of 2, 4, and 6-in. line from its 12-in. Cabin Creek-Bismarck line near Gladstone, N. D., to the towns of Lefor, Regent, New England, and Mott, N. D.

• Proposed 34½ miles of 12¾-in. line to run from Baker-Glendive field in Montana to Rapid City, S. D., and 14 miles of 12¾-in. to replace various lines in Park County, Wyoming, and Carbon County, Montana.

• **Natural Gas Producer, Inc.**—100 miles, 12-in., planned, Yenter pool to Denver, Colo.

• **New River Gas Co.**—50 miles, planned, Summers to Monroe counties, West Virginia, to Narrows and Dublin, W. Va.

• **North Dakota Gas Transmission Co.**—470-mile line from Tioga plant of Signal Oil & Gas Co. and Beaver Lodge field to Fargo and Grand Forks, N. D. Line will have 78 miles of 12-in., 215 miles of 10-in., 70 miles of 8-in., and 107 miles of 6-in. Estimated cost: $10,800,000.

• **Northern Indiana Fuel & Light Co.**—45 miles, 8-in., planned, Edgerton to Auburn, Ind.

Northern Natural Gas Co.—Midwestern Constructors, Inc., has two jobs for company. No. 1 is 94 miles of 30-in. pipelir. consisting of five loops (one in Texas, one in Oklahoma, and three in Kansas). 20 per cent completed as of May 20. No. 2 is 95 miles of 30-in. pipeline consisting of six loops (one in Kansas, one in Nebraska, three in Iowa, and one in Minnesota). 5 per cent completed as of May 20.

93½ miles of 20-in. from Ogden to Waterloo, Iowa; work being done by the Hallmac Construction Co. of Houston.

90 miles of 16-in. from Waterloo to Dubuque, Iowa; work being done by Engineering Construction Co. of Tulsa.

16 and 10-in. branch from Newton to Grinnel, Iowa; work being done by G. G. Griffis Construction Co. of Tulsa.

24 and 26-in. lines south of Paullina, Iowa, and 20 and 24-in. lines from Paullina to Sioux Falls, Iowa; work being done by R. H. Fulton of Lubbock.

Two underwater crossings totaling 5,100 ft. being done by Lone Star Constructors of Dallas.

• 167 miles of 24-in. line proposed to run from Farmington, Minn., to Duluth. Est. cost: $12,195,300.

• **Northwest Alabama Gas District**—40 miles, 9-in., proposed, Southern Natural's line through Windfield to Haleyville, Ala.

Northwest Natural Gas Co.—665 miles of unannounced size pipe to bring gas from Alberta, Canada, to the "Inland Empire" of

Pipeline Patrol

northern Idaho and eastern Washington. Estimated cost: $36,000,000.

• **Ohio Fuel Gas Co.**—31 miles, 20-in., planned, Licking County to Richland County, Ohio.

22 miles, 16-in., planned, Dayton, Troy, Piqua, and Sidney, Ohio.

23 miles, 16-20-in., planned, Wellington to Elyria, Ohio; 16 miles, 20-in., planned, Benton Station to Crawford Station; 18 miles, 20-in., Crawford Station to near Columbus; 16 miles, 16-in., planned, Berlin to Sandusky, Ohio.

74 miles, 3 to 20-in., planned, Hocking, Knox, and Ashland counties, Ohio.

47 miles, 20-in., planned, Benton Township, Hocking County, to Columbus, Ohio.

61 miles, planned, northern and southwestern Ohio.

33 miles, 20-in., proposed, Jefferson to Seneca, Ohio.

69 miles, 20-24-in., proposed, lines to tiein Gulf Interstate line along various points in Lawrence, Jackson, Vinton, Hocking and Fairfield counties, Ohio.

• 24½ miles of 20-in. line in Richland and Crawford counties, Ohio.

Pacific Gas & Electric Co.—200 miles, 34-in., planned, paralleling Topock-Milpitas line. 93 miles completed. 107 miles contracted to Engineers Limited Pipe Line Co. L. E. Robertson is in charge of the spread handling work from Newberry to Danby and from Los Muertos Creek to Gilroy, Calif. Completion November 1954.

15 miles, 20-in., planned for completion in 1955 from Helm Tap to Helm Junction, Calif. Alex Robertson Co.

15 miles, 12-in., planned for completion in 1955. From Herndon to Madera, Calif. Company forces.

13 miles, 16-in., scheduled for completion in 1954. From Fairfield to Napa Wye, Calif. M.G.M. Construction Co.

30 miles, 10-in., scheduled for completion in 1954. From Corning field to Chico, Calif. Company forces.

19 miles, 16-in., from Wild Goose field to Yuba City, Calif. Scheduled for 1954 completion by company forces.

• **Pacific Northwest Pipeline Corp.**—1,466 miles, proposed, Ignacio, Colo., to Bellingham, Wash. Approved by F.P.C.

380 miles, proposed, laterals and spurs off main line to Pocatello, Idaho, to Yakima, Wash.

• **Pine Tree Natural Gas Co.**—204 miles of undetermined size pipe to run from the Boston area to Bangor, Me.

• **Shenandoah Gas Co.**—40 miles, 3-4-8-in., proposed. Middleton, Va., to Martinsburg, W. Va. Est. cost: $1,470,000. FPC approved.

• **South Georgia Natural Gas Co.**—368 miles, 2-12-in., planned, Phoenix, Ala., to Tallahassee, Fla. (a) 12-in., Phoenix, Ala., to Albany, Ga., (b) 10-in., Albany, Ga., to Moultrie, Ga., (c) 8-in., Moultrie, Ga., to Tallahassee. Est. Cost: $9,000,000.

Signal Oil & Gas Co.—Groninger & King are laying approximately 100 miles of gathering lines for this company's Fox gasoline plant in Carter County, Oklahoma.

• **Southeast Alabama Gas District.**—150 miles, 10 and 8-in., planned, Phoenix City to Dothan, Ala. Engineering Const. Co. Start summer 1954.

Tennessee Gas Transmission Co.—Company has awarded following contracts on 566.8 miles of 30-in. line from Kinder, La., to Portland, Tenn.

98.7 miles from Kiner to U. S. Highway 84 near Jena, La., to Morrison Constructors, Inc.

90.2 miles from U. S. Highway 84 to Louisiana side of Mississippi River to Anderson Brothers Corp.

105 miles from Mississippi River to U. S. Highway 51 near Grenada, Miss., to Houston Contracting Co.

101.6 miles from Grenada to U. S. Highway 45 near Corinth, Miss., to Oklahoma Pipe Line Constructors.

94.9 miles from U. S. Highway 45 to near Centerville, Tenn., to Western Pipe Line Constructors, Inc.

75.6 miles from Centerville to near Portland, Tenn., to Panama-Williams Co.

63 miles, 26-in., planned, loops in Ohio and Pennsylvania.

45 miles, 20-in., proposed, Buffalo, N. Y., to the U.S.-Canadian border near St. Catherines.

243 miles 24-in., planned, Coudersport, Pa., eastward across Pennsylvania, New Jersey, and New York to point near Greenwich, Conn.

• **Texas Eastern Transmission Corp.**—Proposed, 225-mile, 30-in. line from Castor, La., to Kosciusko, Miss., to connect with its existing 30-in. line there to Connellsville and replace the "Little Inch" in moving natural gas.

• **Texas Eastern Penn-Jersey Transmission** Corp.—265 miles, 24-in., approved by the FPC from Oakford Storage field in western Pennsylvania to Texas Eastern Transmission Corp.'s Compressor Station No. 26 near Lambertville, N. J. Est. cost: $30,755,000. 54 miles let to H. C. Price Co. C. E. Shivel, superintendent.

• **Texas Gas Transmission Corp.**—48 miles, 26-in., planned, loops from Memphis to Slaughters, Ky.

24 miles, 16-in. line planned from North Tepetate field, Acadia Parish, Louisiana, to South Roanoke field in Jefferson Davis Parish, Louisiana. Work to be done in September and October.

• **Transcontinental Gas Pipe Line Corp.**—421 miles, 30-36-in., looping along Texas-New York line.

19 miles of 12.75-in. pipe starting at West White Lake field in Vermilion Parish, Louisiana, and connecting with applicant's transmission line in same parish. Estimated cost: $1,042,310. FPC approval received.

• 57 miles of 36 and 30-in. paralleling sections of its existing system in Louisiana, Mississippi, and Alabama. Approved by FPC. Est. cost: $6,533,000.

• 25 miles of 12-in. in Cameron and Calcasieu parishes, Louisiana, to additional gas reserves. Est. cost: $1,000,000.

• **Trans-Northwest Gas, Inc.**—246 miles, proposed, International Boundary near Osoyoos, B. C., to Washington and Idaho.

275 miles, branch lines.

• **Trunkline Gas Co.**—Proposes to cross the Mississippi River with two 24-in. lines near Greenville, Miss. Est. cost: $2,960,000.

• **United Fuel Gas Co.**—52 miles, 20-24-in., proposed, Wood County to Lanham, W. Va. Spring 1954.

57 miles, 30-in., under way, Lanham in Kanawha County, West Virginia, to Gulf Interstate line in Boyd County, Kentucky Spring '54. C. R. Ice, spreadman.

Utah Natural Gas Co.—Planning 40 miles from Orem to Salt Lake City, 16-in. pipe at later date. Contract not let yet.

Virginia Natural Gas Co.—153 miles, Buckingham to Richmond and Portsmouth, Va.

Foreign Crude-Oil Pipelines

• **Atlas-Dresser.**—Included in this company's agreement with the Argentine Government are plans to built a 400-mile, 16-in. crude line from Plaza Huincul area to Bahia Blanca.

Bombay Port Trust.—50 miles, 8 to 24-in., contracted, Bombay, India, to serve Standard Vacuum Oil Co., and Burmah Shell refineries. Merritt, Chapman & Scott Corp., con-

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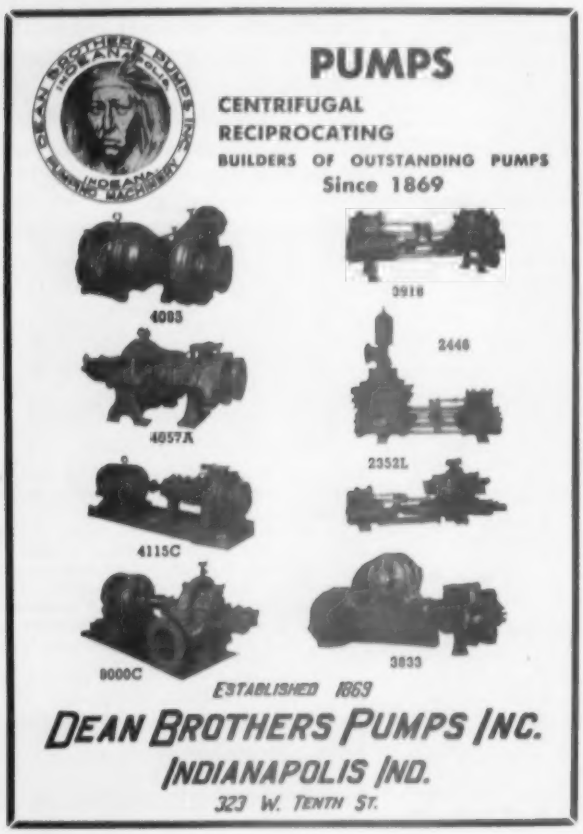
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tractors. (Crude and Products). Collins Const. Co. has subbed 84,000 ft. of Subaqueous work. Shutdown for Monsoon season. Work will resume September 15.

Creole Petroleum Corp.—21 miles, 34-in. crude line to run from Lagunillas field to La Salina, Venezuela. Williams Brothers Overseas Co. has contract with construction slated to start in February and to be completed in 6 months. Line when completed will be the world's largest-diameter crude line.

Direccion General de Yacimientos Petroliferos Fiscales—409 miles, under way, Plaza Huincul to Bahia Blanca, Argentina.

• **Gaz de France**—200 miles, 12-in. Ruhr to Paris, France.

Interprovincial Pipe Line Co. and Lakehead Pipe Line Co.—Contracts have been awarded for 604 miles of looping; 454 miles will be in Canada, the remaining 150 miles will be in the United States.

201 miles of 24-in. between Regina and Gretna, Man., have been awarded to Anderson International Contractors, Ltd., of Edmonton, Alta.

Mannix, Ltd., of Calgary, Alta., will lay 129 miles of 24-in. line between Edmonton and the Alberta-Saskatchewan boundary.

Fulton-Bannister, Ltd., has contract for 125 miles of 24-in. line to connect the lines being built by Anderson and Mannix.

R. H. Fulton & Co., of Lubbock, Tex., has the contract for 104 miles of 26-in. looping from the Canadian border southeast. Anderson Bros. Corp. has contract for 50 miles of 26-in.

• **Mid-Saskatchewan Pipelines, Ltd.**—Proposed line from Smiley Viking oil field to connect with Interprovincial Pipe Line Co.'s Kerrobert pump station.

• **Pembina Pipe Line Co., Ltd.**—Company has permit to build 325 miles of 3-12-in. gathering line from Pembina field and a 72-mile, 16-in. transmission line to the terminals of Trans Mountain Pipe Line Co. and Interprovincial Pipe Line Co. at Edmonton, Alta.

• **Petroleos Mexicanos.**—145 miles, 12-in., considered, 18 de Marzo field via Reynosa to Monterrey, Mexico.

100 miles, planned, Isthmus of Tehuantepec, Jose Colomo to El Plan field, Minatitlan.

72 miles, 12-in., proposed, Poza Rica to Atzacapotzalco, Mexico.

Petroleos Mexicanos.—125 miles, 10-in., under way, Jose Colomo to El Plan, Mexico.

Texas Petroleum Co.—60 miles, 4-6-in., under way. Pta. Nino de La Dorada.

Texas Petroleum Co.—Contract has been let to Foster Wheeler Corp. and Panama-Williams for a 119-mile 12-in. crude line to move oil from Velasquez field in Colombia to a connection with the main Andian National system at Galan. Est. cost: $6,000,000.

• **Yacimientos Petrolifferos Fiscales Bolivianos.**—170 miles, 4-in., planned, Bermejo to Tupiza, Bolivia.

Foreign Products Pipelines

Anglo-Iranian Oil Co., Ltd.—18½ miles, 16-in., under way, Little Aden to Aden. Bechtel Corp. Completion date December 1954.

18½ miles, 6-in., under way, Little Aden to Aden. Bechtel Corp. Completion date December 1954.

15 miles, 12-in., under way, Kwinana to Fremantle, M. W. Kellogg Co. Completion date February 1955.

17 miles, 6-in., Kwinana to Fremantle. M. W. Kellogg Co. Completion date February 1955.

North Atlantic Treaty Organization (NATO)—1,920 miles, 4-10-in., to serve military bases in Western Europe (to connect with U. S. Government's St. Nazaire-Paris-Metz line.) Contracted by Soc. Foster Wheeler Francaise.

• **Petroleos Mexicanos.**—124 miles, 6-in., planned, Lagos to Guadalajara, Mexico.

54 miles, 6-in., planned, Lagos to Aguascalientes, Mexico.

82 miles, 8-in., planned, Salamanca to Lagos, Mexico.

• **United States Government.**—375 miles, 12-in., planned, St. Nazaire to Melun and Metz, France.

• **United States Navy Department.**—Proposed 300-500-mile line to be built in Spain to serve a proposed naval base and four large air bases which are also proposed under a defense agreement with the Spanish Government. No definite size or cost is known now.

Foreign Natural-Gas Pipelines

Azienda Generale Italiana Petroli—9[illegible] miles, 12-in., under way, Cortemaggiore to Bologna, Italy, SNAM crews.

120 miles, 16-in., under way, Cremona Porto Mar to Ghera, Italy, Montubi, contractor.

40 miles, 12-in., under way, Ripalta-Bergamo, Italy.

• **Burma Oil Co., Ltd.**—350-mile, 16-in. line planned from Sui field to Karachi in West Pakistan. Estimated cost: $25,000,000. Morrison-Knudson Const. Co. doing work.

Direccion General del Gas del Estado—310 miles, 8-in., under way, Plaza Huincul to Neuquen, Argentina, to the vicinity of General Conesa, Argentina.

• **Empresa Nacional del Petroleo**—8[illegible] miles, 10-in., planned, Concon to Santiago Chile.

• **Trans-Canada Pipe Lines, Ltd., (Canadian Delhi Oil Co.)**—2,247 miles, 14 to 30-in., proposed, Alberta to Toronto to Montreal.

747 miles, 8 to 24-in., gathering system in Alberta.

• **Union Gas Co. of Canada, Ltd.**—Proposed line from Lambton County gas-storage fields to Oakville. Line is being proposed now and will eventually join with proposed line from Alberta to Toronto and Montreal.

• **U. S. Navy**—Proposes to build gas line from Gubik gas field near Navy Petroleum Reserve No. 4 in Alaska to Fairbanks. Line would be 450-mile, 8-in. line and Arctic Contractor, Inc., who handled engineering requirements and preliminary design estimated the line would cost $20,000,000, although later figures have been much higher than this.

• **Western Pipe Lines, Ltd.**—Will build 80-mile, 20-in. line from Niagara Falls, N. Y. to Toronto. Gas will be furnished by Tennessee Gas Transmission and taken over in Toronto by Consumers Gas Co. Est. cost: $7,000,000. Canadian Bechtel, Ltd., doing engineering work.

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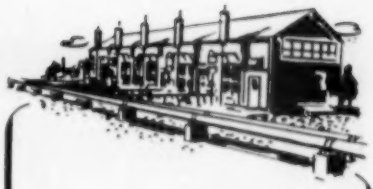

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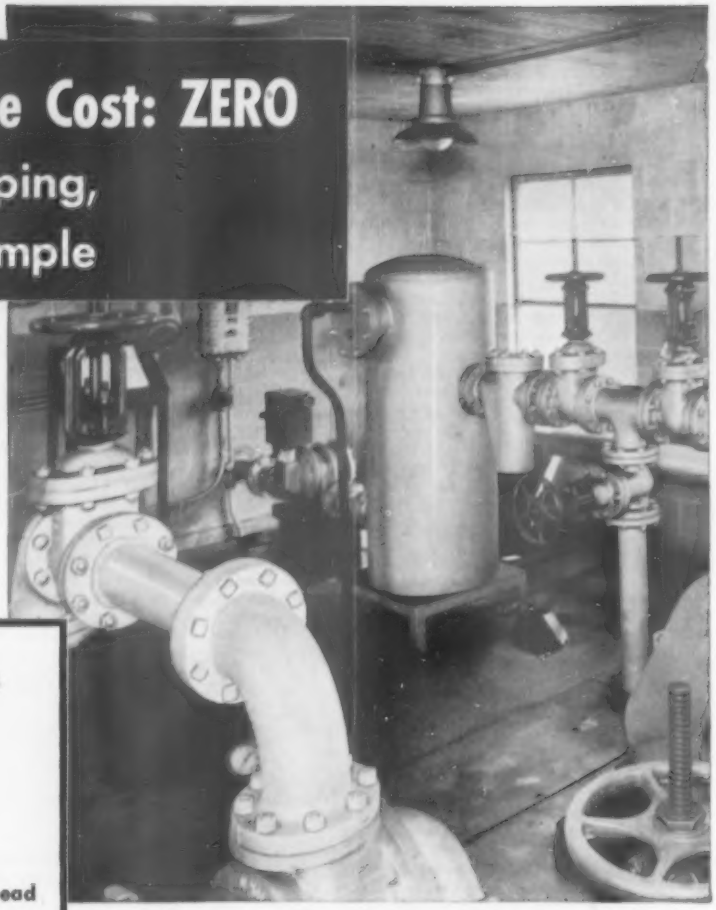
Valve Maintenance Cost: ZERO

...on fuel oil piping, for example



The Installation

At North End Yard, The Cincinnati Union Terminal Railroad, using Crane steel valves and fittings throughout diesel fuel receiving and filling system. Working pressure, 40 pounds.

Valve Service Ratings

SUITABILITY:
Doing the job as intended

FEATURES:
Exelloy seating

MAINTENANCE COST:
Zero

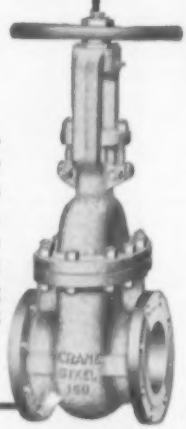
SERVICE LIFE:
Installed 1948—Shows long life ahead

OPERATING RESULTS:
Low-cost, trouble-free fueling

AVAILABILITY:
Crane catalog item—No. 47X

The Valve

150-Pound Steel Gate—with its exceptional performance assured by Crane quality design . . . by Crane pioneering skill in steel casting . . . and the high adaptability of Crane Exelloy trim for oil services. Sizes 2 to 24 in.; screwed, flanged, or welding ends. See your Crane Catalog, or ask your Crane Representative.



The Case History

Not until the terminal's engineers were convinced of its dependability and low-cost maintenance was any equipment bought for this project. Many similar systems were studied for the best means of assuring utmost economy of operation. The installation was made in 1948 . . . with welded piping where practical, using Crane materials exclusively—steel fittings, check valves, and No. 47X, 150-Pound steel gate valves.

More than 5 years later the terminal reports: Piping system operation entirely satisfactory; maintenance cost to date: zero. Further result: Crane valves have earned top consideration for proposed extension of system. The terminal knows the value of thrifty buying—quality always outweighs price-tag savings.

THE BETTER QUALITY...BIGGER VALUE LINE...IN BRASS, STEEL, IRON

CRANE VALVES

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Illinois
Branches and Wholesalers Serving All Industrial Areas

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The cards shown here are supplied for your convenience. Just ✓ ✓ ✓ check the circle with the number of the item in which you are interested, tear off the card, and drop it in the mail.

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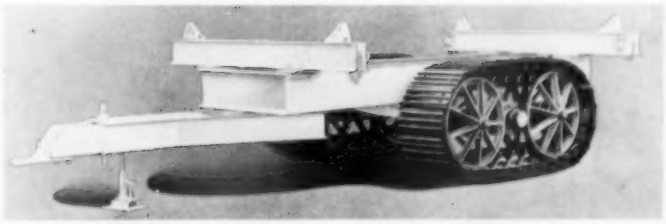
. . . What's New in Equipment?

Use the handy Time-Saver Cards ✔✔✔ to obtain additional information on these items

by Dan B. Miller



New Trailer Equipped With Tracks

A new trailer, the Universal Forged-Trak trailer, can haul any heavy and bulky load anywhere a track-type tractor can travel and can be converted to meet individual hauling problems. There are several component parts that are easily interchanged for specific needs.

The basic trailer frame is sturdily constructed of structural steel with strong bracing of channel and angle sections. The frame is equipped with an adjustable drawbar that can be set at any of three lengths to match load lengths. A locking pin secures the drawbar while hauling. A hydraulic jack, offered as optional equipment for connecting and disconnecting the trailer from the tractor, stores conveniently in a corner of the frame, ready for immediate use.

Users can choose from five sizes ranging from 6 to 30 tons. The crawler-type threads provide exceptional ground support to carry loads safely through mud, sand, snow, or rocks. These broad Forged-Traks are designed with a special stub axle that mounts into a steel housing in the frame. The wheel's rocker beam can oscillate on these heat-treated axles to follow the contour of the terrain.

Loads from 12 to 30 ft. in length can be hauled with this equipment. When two trailers are combined in tandem, exceptionally long loads can be hauled. Swiveling bunks are then employed, one for each trailer. These bunks, rotating in a subframe when turning, have adjustable chock blocks. Loads up to 56 ft. long can be hauled.

The Universal Forged-Trak trailer will permit contractors, oil-field men, pipeliners, and other off-road haulers to haul big loads in spite of adverse ground conditions. Rolling resistance is extremely low, keeping drawbar pull requirements low and permitting one tractor to pull big trains of loaded trailers. *Athey Products Corp.*

Check No. 1 On The Time Saver Card

●

Torque Converters Made For Lower-Power Range

Torque converters meeting the requirements of heavy-duty operation now are available for application in the lower-power ranges. The new converters, designated as the TC-200 and TC-300 series, can be used with either gasoline or diesel engines in the 40 to 150-hp. range.

Because the converter has been designed as a standard package to blanket this field, this new series can be offered within the price range of the automotive type. In addition, many features such as the combination of hydraulic torque multiplication with fluid coupling are standard in the converter.

The unit is designed for simplified flexible installation because integral with the converter are oil system, charging oil pump, oil cooler, oil sump, and gear drive. Installation can be made on any S.A.E. standard-power takeoff flywheel.

Available with the basic converter are a wide variety of options including front disconnect clutches and adapters, rear disconnect clutch adapters, automotive-type flanges, industrial shafts, and governor drives. *Allison Division of General Motors Corp.*

Check No. 2 On The Time Saver Card

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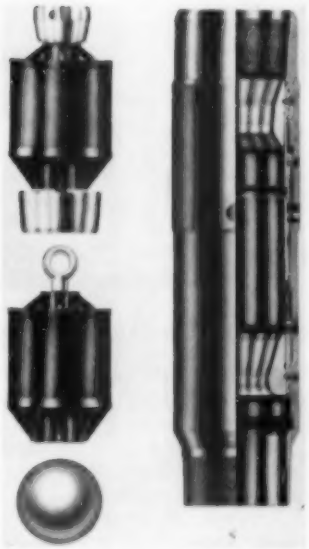

Two-Plug Stage Cementer Features Efficient Jobs

A new Two-Plug Stage Cementing tool features simplicity and efficiency, in addition to assuring a successful cementing job. The stage cementer employs the same basic principles as the Fulbore cementing method. The stage cementer is set at a predetermined point in the casing string when made up so that when the lower cementing job is completed, the operator can proceed with cementing operations at the upper level without setting additional equipment.

When the lower cementing job is completed, a weighted trip ball is dropped and seats in a tapered aluminum baffle in the lower part of the stage cementing tool. Pressure is then applied to the seal and at approximately 600 psi., shears the pins and trips the lower steel sleeve to open four 1¼-in. diameter ports to allow free

circulation to the surface. A steel snap ring engages a shoulder to prevent any upward movement of the lower steel sleeve.

The bottom plug is then released from the cementing head and is followed immediately by the cement slurry. The plug seats in the lower steel sleeve so that the slurry passes out through the four open ports. The top plug, with an aluminum trip attached to the bottom side, is released from the cementing head and pumped into place in an upper aluminum baffle. At approximately 600 psi., the pins holding the upper sleeve and baffle in position are sheared so that the sleeve moves downward and closes the four 1¼-in. ports to complete the stage cement job.

A final steel-to-steel closure of the ports is accomplished as a tapered surface on the upper steel sleeve wedges tightly into a corresponding tapered surface on the body of the stage tool. A steel snap ring engages a shoulder just above the taper wedge to lock the upper steel sleeve in position. *Rector Well Equipment Co.*

Check No. 3 On the Times Saver Card

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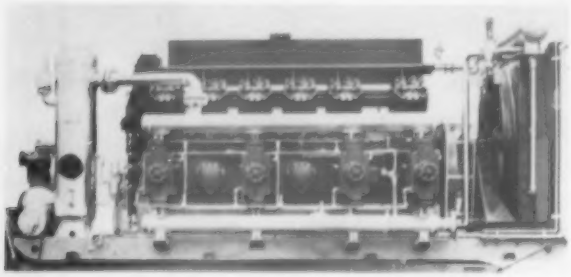

New 660-Hp. Compressor Is Preassembled

A new 660-hp. packaged compressor plant is built around Ingersoll-Rand 12SVG gas-engine-driven compressor. The new packaged plant is designed for single or multiple-unit installation on gas pipelines, gathering lines, and gas-lift system. By using these 660-hp. plants in banks, it is possible to install a compressor station with thousands of horsepower at the low cost per horsepower.

The entire unit is assembled on an integral-fabricated steel base. The rugedly constructed base eliminates the necessity for an expensive foundation at the operating site. No more than a concrete slab is required. Installation time and expense are reduced because of complete assembly in the factory.

In spite of its large capacity, the 12SVG packaged compressor plant may be transported on heavy oil-field trailers directly to location. The new model includes all necessary auxiliary equipment and controls. *The J. B. Beaird Co., Inc.*

Check No. 4 On The Time Saver Card

●

New Tractor Attachment Rips Deep-Rooted Stumps

The time, effort, and expense required to remove deep-rooted stumps and trees has been greatly reduced by the new Pull Stumper. The Pull Stumper, for use with track-type tractors, consists of a single tooth, of high-quality cast steel, connected to the tractor drawbar by a one-piece cast steel frame. The tooth is designed to withstand great stress and is hard-surfaced for wear resistance. The unit is operated by cable, working through an A-frame, from one drum of a cable control.

Forward pull of the tractor pulls the curved tooth into the ground to any desired depth to a maximum 36 in. to cut lateral roots. The tooth is then hooked into the stump and forward motion, combined with line pull, rips stumps and roots from the ground. The same action can be applied to boulders. A hook on the rear allows use of the tool for lifting or loading.

When not in use, the unit is raised to a vertical position to permit free use of the tractor on other work. The tool is easily and quickly detached when necessary. It is offered in three sizes for use with tractors in the D8, D7, and D6 classes. *Fleco Corp.*

Check No. 5 On The Time Saver Card

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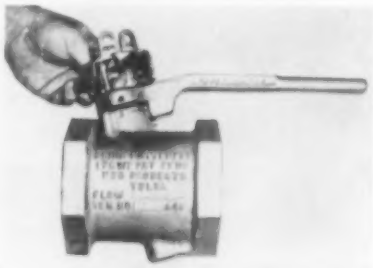


O-Ring Butterfly Valves Made In Smaller Sizes

A new line of semisteel Mudco O-ring butterfly valves are offered in small sizes. These quick-closing, positive seal, nonlubricated valves, first developed for oil-well drilling-rig mud lines, are made in a wide choice of materials including: steel, bronze, aluminum, semisteel, semisteel with a ceramic lining, and stainless steel. These many materials and a wide range of sizes have caused acceptance of this valve in nearly all industries requiring piping with quick-closing valves. *Mud Products, Inc.*

Check No. 6 On the Time Saver Card

●

Safety Cap Weighs Only Nine Ounces

A sturdy, but light safety cap, weighs only 9 oz. The new Safe-T-Cap is a modification of the T-Hat. The elimination of the normal full brim all around allows objects to be carried on

a worker's shoulders without tipping or knocking off the cap. Its comfort and lightweight make it ideal for foremen and other supervisory employs.

The crown of the T-Cap features the duralumin, radial-ribbed construction which deflects falling objects rather than absorbing the force of the blow. A soft leather headband, fully suspended to help absorb shock and allow cooling air circulation, adjusts simply to any head size. *B. F. McDonald Co.*

Check No. 7 On The Time Saver Card

●

Flow-Actuated Switches Guard Against Flow Change

Flow-actuated electrical switches are positive mechanical devices which open or close electrical circuits at predetermined rates of flow of liquids. These units can start and stop pumps, valves, alarms, signals, and controls, in related and unrelated process operations such as mixing, blending, filling, and emptying. These switches protect expensive products and equipment against the hazards of undesirable increase, decrease, or loss of flow.

Flow-actuated electrical switches are made to fit lines from ¼ to 60 in. in brass, bronze, steel, and stainless steel, with a wide variety of electrical-switching arrangements and capacities. They are inherently leakproof and do not employ packing glands or stuffing boxes in their construction. *Power Engineering & Equipment Co., Inc.*

Check No. 8 On The Time Saver Card

●

New Unit Measures Level Of Liquid in Closed Tank

A new instrument measures the level of liquids in a closed tank, either under pressure or vacuum. The new instrument, known as a differential converter, converts differential pressure into proportionate air pressure which in turn is transmitted to indicators, recorders, and controlling equipment.

The instrument utilizes a pneumatic balance weigh-beam system and is small and lightweight. Since it does not use mercury as a seal, maintenance is reduced by eliminating the need for seal pots and purges. The range of the instrument is readily adjustable in field applications from 0-14 to 0-200 in. of water. The level reading over the entire range of measurement is continuous. Available with both steel and stainless steel bodies, the unit can withstand temperatures up to 350° F. and is rated at 750 or 1,500 psi.

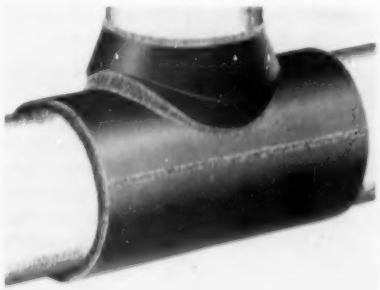
When used with either strip-chart recorders or circular-chart recorders, the differential converter will furnish records for operation analysis, inventory checks, and cost accounting purposes. *Industrial Division, Minneapolis-Honeywell Regulator Co.*

Check No. 9 On The Time Saver Card

●

Split Tee Is Ideal Where Encirclement Is Needed

A new WeldOlet split tee, assembled and ready for field installation is specially designed for hot taps and new construction in the oil and gas transmission industries. It is immediately available.



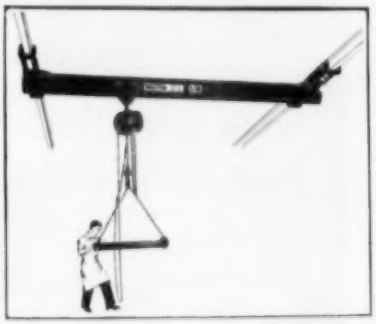
The WeldOlet split tee is advantageous where full encirclement reinforcing is necessary. It is engineered to meet size and service requirements from the smallest sizes to 30-in. outlets for run lines through 36 in. *Bonney Forge & Tool Works.*

Check No. 10 On The Time Saver Card

●

Industrial Enlarges Push-Type Overhead Crane Line

A light-duty model push-type crane with new, improved construction features is available in five different capacities, and heavy-duty models are available in seven capacities. The heavy-duty models feature smooth performance and ease of operation because of precision-manufactured end trucks. The underhung heavy-duty cranes are equipped with forged-steel wheels with removable head axles.



All heavy-duty push-type cranes are available in various spans and can be equipped with hand-operated or electric hoists. *Industrial Crane & Hoist Corp.*

Check No. 11 On The Time Saver Card

●

Dragnet Locates Leaks in Pressure-Piping Systems

A new time-saving instrument for detecting and locating leaks in all types of pressure-piping systems is applicable for testing piping for gas, steam, water, oil, refrigerants, air, and other pressure or vacuum systems.

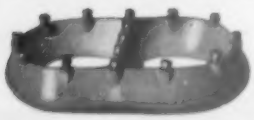
Dragnet leak detector is portable and consists of a test pump, air-storage tank, pressure gage, transparent bubble bowl with nonfreezing fluid, and a flexible hose for connecting to piping under test.

After the piping system is pumped with air to the desired pressure, the bypass valve is closed, requiring any air entering the pipe from the storage tank to flow through the bubble bowl. Any leak in the piping brings air from the storage tank through the dip tube in the bubble bowl, causing the liquid to bubble, thus indicating the leak. If no bubbles occur when the bypass valve is closed, then there is no leak in the piping system.

A filler plug in the storage tank is provided for injecting leak-locating odorant or chemical. This mixes with air and is pumped out to the piping. A complete test can usually be completed within 10 to 15 minutes. *Universal Controls Corp.*

Check No. 12 On The Time Saver Card

Longer Life For Your Boiler



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Inferno stream-lined stack blowers assure maximum efficiency with a minimum use of steam. The use of Inferno steam blowers with short stacks and automatic fire and blower control will increase the life of your boiler. Inferno stack blowers are of streamlined design to secure the least resistance to the flue gases and occupy a minimum of space. Write for Bulletin 22-A.

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New Truck Crane Booklet. A complete Booklet TX-143 entirely new, reports fully on P&H truck cranes. Devoted to the Models 255-A, 355-A, and 555-A, the two-color bulletin gives a broad picture story on these machines. Within its 28 pages, in addition to dozens of large-size on-the-job pictures, are complete descriptions and specifications of important features such as carriers, power plants, torsion-bar front axles, and convertibility. *Harnischfeger Corp.*

Check No. 13 On The Time Saver Card

●

Ratchet-Lever Hoist Bulletin. A new eight-page bulletin on Safety-Pull ratchet-lever hoists describes the entire line of ratchet-level hoists, including both roller and coil-chain models, with capacities ranging from ¾ to 15 tons. In addition to features, specifications, and special hooks, the bulletin illustrates the ratchet-pawl construction that eliminates friction brakes and the quick-disassembly feature of the coil-chain hoists. *Coffing Hoist Co.*

Check No. 14 On The Time Saver Card

●

Guiberson AF Packer for acidizing, flooding, fracturing, and other below packer pressure operations is described in a four-page folder that is perforated for loose-leaf binding. An exploded line drawing of the packer gives parts nomenclature and data tables include prices, part number, and number required. Setting and pulling procedures are detailed in a step-by-step outline. *The Guiberson Corp.*

Check No. 15 On The Time Saver Card

●

McCullough Tool General Catalog. A new 40-page, illustrated general catalog contains a complete description of the entire line of specialized tools and services available to the oil industry. It gives a comprehensive explanation of the sizes, applications, operation, and most recent improvements in such tools as the M-3 bullet-type perforators and Glass Jet perforators, the Magna-Tector, jet casing cutters, bottom-hole jet cutters, and Type B bridge plugs. An expanded section gives information on radiation well-logging service. Also featured is a description of a new one-trip backoff service. *McCullough Tool Co.*

Check No. 16 On The Time Saver Card

●

"What Is Hall Laboratories?" The highlights of 30 years' devotion to solving problems related to the procurement, treatment, use, and disposal of industrial water have been condensed into a new 10-page booklet. Briefly touching on production problems in steel, textile, chemical, and metal plating plants, plus a refinery, the new literature reports on Hall Laboratories tracing the cause of troubles to the industrial water system, between its source and its final effluent. *Hall Laboratories, Inc.*

Check No. 17 On The Time Saver Card

●

Diesel, Dual-Fuel, and Gas Engines. Pictorially illustrated from cover to cover, the new Bulletin S-500-B13C gives available engine types, horsepower ratings, and plant auxiliaries, as well as the numerous applications possible for the various types of engines. Illustrated are engine applications in power plants, gas distribution and pipeline stations, and in gas, chemical, and refinery operations. *Worthington Corp.*

Check No. 18 On The Time Saver Card

●

Dual-Indicating Temperature Controller. Bulletin 6430 describes the new dual-temperature controller, a versatile and rugged instrument which incorporates two complete system for measuring, indicating, and controlling two temperatures. Bulletin includes information on application, control forms, and ranges. *Industrial Division, Minneapolis-Honeywell Regulator Co.*

Check No. 19 On The Time Saver Card

●

Mechanical Instrument Catalog. A new Catalog M-2-A illustrates and gives complete basic information on mechanical industrial instruments. The line includes fixed-stem and distant-reading dial thermometers; temperature and pressure recorders, nonindicating controllers, indicating and recording controllers; accessories; and diaphragm motor valves. *Western Electrical Instrument Corp.*

Check No. 20 On The Time Saver Card

●

Technical Data on Rigid Plastic-Piping Products. A new standard file folder contains loose-leaf, punched sheets for

ready reference. Technical data include allowable working pressures at various temperatures for different pipe sizes, chemical resistance values, physical properties of several types of plastic pipe, and head-loss curves. Engineering information covers applications, specifications, and prices on both pipe and fittings, along with dimensions of various fittings. Specific information is given on cutting, threading, and joint makeup. These steps for installation of plastic piping are described and illustrated with actual photographs of the operations. *Clopipe Division, Clopay Corp.*

Check No. 21 On The Time Saver Card

●

Homogeneous V-Rings. A complete line of homogeneous V-rings molded to J.I.C. accepted dimensional standards are described in a new bulletin. These V-rings are made from two types of synthetic rubber. Low friction, low selling, and high wear-resisting characteristics are claimed for rings made using Neoprene base compound. Rings made using Buna-N base compound have been developed to meet the need for rings with high oil resistance but having low-friction and high-wear-resistance features. *Packing Division, Raybestos-Manhattan, Inc.*

Check No. 22 On The Time Saver Card

●

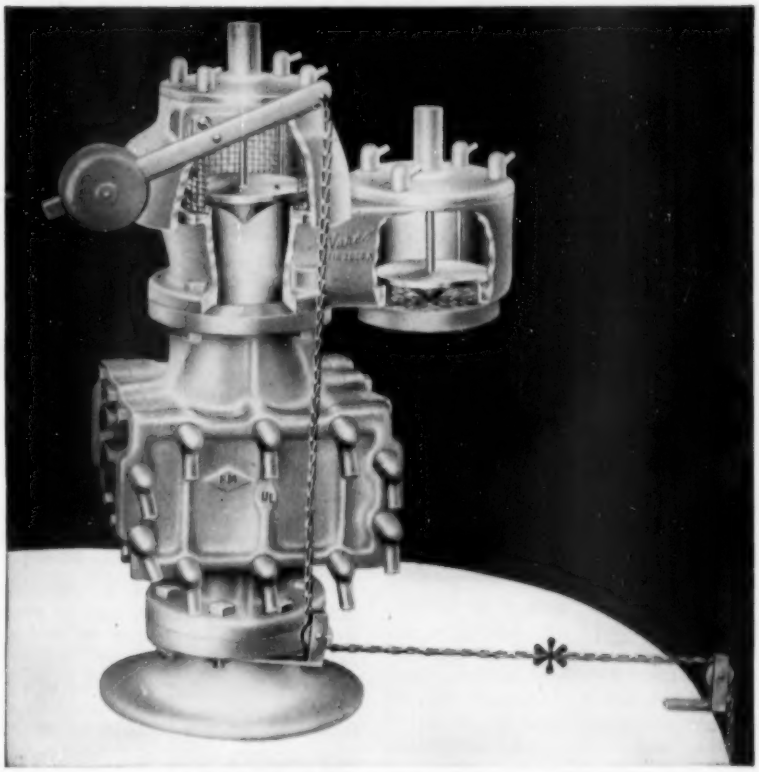
SMA-00 and SMA-000 LimiTorque Valve Controls. Bulletin SMA-000 describes a motorized valve operator for small valves ranging from 1½ to 8-in. part diameters. These new valve operators may be controlled electrically from any conveniently located push-button station. In case of power failure, a handwheel is incorporated. As the name implies, LimiTorque limits the amount of torque applied to valve operating parts. Also the amount of torque or stem thrust may be accurately adjusted for varying service conditions through a micrometer-type torque switch. *Philadelphia Gear Works.*

Check No. 23 On The Time Saver Card

●

Model S Treater. Four-page Catalog 31-03 describes a well-balanced treating unit for low-cost treating. It features a four-color flow diagram, dimensional drawings, and complete description of the Model S treater. Tables include sizes available, oil-treating capacity, gas capacity, fluid capacity, working pressure, heating capacity, fuel consumption, heating surface, and shipping weight. *Black, Sivalls & Bryson, Inc.*

Check No. 24 On The Time Saver Card



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Considerable profits are dissipated to the atmosphere when vent pallets warp, stick open or prevent excessive "blowdown." "VAREC" Fig. No. 5800 Conservation Vent Units are ideal equipment for venting volatile or inflammable liquid storage. They protect against dangerous over and under pressures and accidental ignition. Streamlined passages insure maximum flow. Regrindable and renewable metal pallet seats provide extra long life. Drip rings eliminate condensate collection, reducing possibility of freezing. Hyperbolic pallets, loosely guided, prevent sticking and minimize flutter. Flame Arrester unit listed by Underwriters' Laboratories and approved by Factory Mutual Laboratories. Send for free Bulletin CP-2001.

✱ *Remote Control Flame Snuffer Sheave Brackets, Fig. 130 are optional at extra cost. This assembly is preferable where vent unit is set back from edge of tank.*

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THE VAPOR RECOVERY SYSTEMS COMPANY

COMPTON, CALIFORNIA

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58-1

EQUIPMENT MEN . . . in the News

Dewey Supply Elects Three New Officers

Board of directors of Dewey Supply Co. in their last meeting elected new officers of the company: Dewey F. Bartlett, president; Clinton Beard, executive vice president and general manager; and David A. Bartlett, secretary and treasurer. Other directors of the company, beside the newly elected officers, are Wilbur J. Holleman and Charles E. Derrick.

D. F. BARTLETT

D. A. BARTLETT

Dewey Supply, which has serviced the oil and gas industry since 1935, recently opened a general office in National Bank of Tulsa Building, and has stores in Dewey, Ada, and Skiatook, Okla.

Ray-O-Lite Develops Fiber-Glass Engine House

JACK WALKER

Jack Walker, vice president of Ray-O-Lite Corp. of the Southwest, has announced the organization of this firm to fabricate and distribute a new, portable, fiber-glass engine house for drilling rigs. Manufacturing facilities have been installed at Oklahoma City and the distributor organization is in the process of being set up. The engine house, developed by Ray-O-Lite, is constructed of large, translucent sheets of corrugated fiberglass fitted to an angle-iron frame with slipjoints. Slipjoints hold the frame as solidly as if it were riveted. The entire engine house can be dismantled and moved to the next location for re-erection without the use of tools.

Other officers of the company are: E. A. Fariss, Oklahoma City, president and treasurer, and P. G. Wilson, vice president in charge of production.

Worthington Moves Power Pump Operation to Pa.

Worthington Corp. is moving its entire reciprocating power pump operation now handled at the Harrison, N. J., works to its Oil City, Pa., plant, according to Edwin J. Schwanhausser, executive vice president.

Involved in the transfer are the engineering, manufacturing, sales, and parts replacement programs. The move will be completed about June 16. Greater space available at Oil City plus the technical experience and ability of Oil City Works' personnel in the manufacture of reciprocating power pumps were factors considered in the decisions to relocate the operation. Improvements in delivery and service are anticipated because of proximity to oilfield and industrial hydraulic markets from the new location.

Reciprocating steam pumps will continue to be manufactured at Harrison Works.

French Engineer Visits Otis Pressure Control

Bill Dollison, second from right, administrative engineer for Otis Pressure Control, Inc., points out a test-well operation to Andre Barody, a wire-line operator for France's Societe Nationale des Petroles de 'Aquitaine, at Otis' Dallas plant. Barody recently spent several days at the Otis plant prior to a tour of duty with Otis' field crews in New Iberia, La. He is in this country to familiarize himself with the fundamental operations and maintenance of Otis control equipment which is being used by the French Government in the Lacq field in Southwest France. Assisting in the test are Art Taylor, far left, and Shelby Graves, right, both of Otis.

McCullough Reorganizes Mountain Division

ELMER MOODY

I. J. McCullough, president of McCullough Tool Co., announces eight promotions in the Mountain division of the company and the opening of two new service branches in Wyoming. Elmer Moody, formerly service manager of the Williston, N. D., branch, has been appointed general manager of operations in the Mountain division. Moody will make his headquarters at Casper, Wyo., where he will supervise all operations of the various McCullough branches throughout the Rocky Mountain area. Moody is a veteran of 12 years' service with the company.

GLEN HORRIE

W. McCULLOUGH

Glen Horrie, formerly sales engineer at the McCullough Bakersfield, Calif., branch, has been appointed sales manager for the Mountain division and will be directly in charge of all sales engineers in the Mountain division. He has been with the company for over 5 years.

W. A. McCullough has been appointed division manager of logging operations in the Mountain division. He will remain in Casper and will direct all logging activities of the company in that area.

Harry Whittaker has been appointed service manager of the Williston branch, replacing Elmer Moody.

The two new service branches are located at Newcastle and Cody, Wyo. William Newashe has been appointed service manager at Cody. William Shields has been appointed service manager at Newcastle. James E. Wren will take over the duties of sales engineer at the Newcastle branch.

Loren L. Ashley has been appointed sales engineer at the Sterling, Colo.,

branch. Vearl J. Sanders, sales engineer, has been transferred from the Williston branch to Bakersfield branch.

Bryant to Manage Iverson Kermit, Tex., Store

T. E. (Tom) Bryant has been promoted to the position of store manager of the Kermit, Tex., store for Iverson Supply Co., Tulsa, according to S. J. Iverson, president.

Bryant was previously field salesman out of the Framington, N. M., store, and is a veteran in the supply industry having 15 years' experience with two major supply firms, prior to joining Iverson.

Leadbetter Elected Prexy Of Burgess-Manning Co.

LEADBETTER

Ralph L. Leadbetter, Dallas, has been elected president of Burgess-Manning Co., manufacturers of industrial noise abating equipment, Jackson Burgess, chairman of the board, has announced. Leadbetter succeeds Willis L. Manning who has been president since the company was organized in 1944. Manning will retain his position as treasurer and a member of the board of directors.

Leadbetter has been vice president since 1944 and was in charge of the company's Dallas division since its formation in 1951.

Other officers elected by the board were: Jackson Burgess, chairman of the board; Dudley W. Day, vice president; E. D. Woisard, secretary and assistant treasurer; and A. W. Dreffein, assistant secretary.

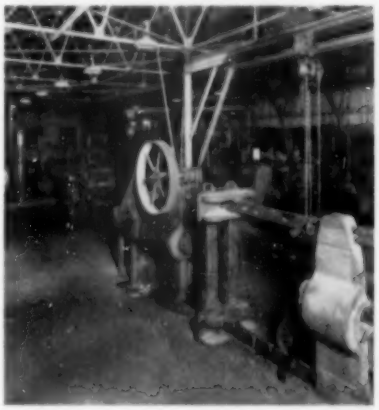
Named to the board of directors, in addition to Burgess and Manning, were: H. H. Darbo, Chicago; Leadbetter; Benjamin S. Reynolds, Madison, Wis.; and J. Dean Vail, Jr., Chicago.

Dravo Corp. Moves Case To Pittsburgh Staff

Appointment of Harry E. Case to its staff as sales engineer was announced recently by Dravo Corp., machinery division, Pittsburgh.

Before joining Dravo's Pittsburgh office, Case served in the same capacity with Dravo, machinery division, Philadelphia office. Prior to this he was associated with De Laval Steam Turbine Co. in various engineering and sales capacities.

Stine Machine Shop Will Make Oil-Field Equipment



Pictured above is a partial view of the interior of Joe Stine shop building, Houston. This completely equipped shop was recently purchased by Joe Stine and will be engaged in the manufacture of oil-well drilling specialties and heavy-plate equipment for rigs, general machine work, rig building, and unitizing. Joe Stine, prior to the purchase of these facilities, was president and general manager of S & R Tool Co., Houston.

Oilwell Names White as Area Merchandise Manager

Promotion of D. R. White to area merchandise manager for the Central Midwest area has been announced by D. H. Barr, general merchandise manager for U. S. Steel's Oil Well Supply Division. White, whose headquarters will be at Dallas, will be responsible for inventory administration and procurement in the Central Midwest area.

White was employed by Oilwell in 1947 in the accounting department at its general offices at Dallas. Later that year he became a field auditor for U. S. Steel, and in 1950 he was transferred to Midland, Tex., as assistant district material supervisor for Oilwell. From 1951 until his new assignment he has served as assistant to the district merchandise manager at Wichita Falls, Tex.

Well Equipment Shifts Durkin to Louisiana Post

L. L. DURKIN

L. L. Durkin, who has represented Well Equipment Manufacturing Corp. in the Rocky Mountain area with headquarters in Denver for the past 18 months, is being transferred to the South Louisiana district with headquarters in New Orleans, according to word received from John W. Gates, company sales manager.

Durkin, who has been with Well Equipment for the past 4 years, was sales representative for the company in the East Texas area prior to being transferred to Denver.

Rockwell Texas Plant Starts Production

Rockwell Manufacturing Co.'s new 116,000-sq. ft. completely air-conditioned manufacturing plant at Sulphur Springs, Tex., has started production operations, L. A. Dixon, Jr., vice president in charge of meter and valve division, has announced.

Established to serve users of valves, meters, and other Rockwell products in the petroleum, natural gas, chemical, and petrochemical industries in the Southwest and South, the plant is now producing steel Hypreseal valves in sizes up to 4 in. and in pressure ranges up to 10,000 lb. per sq. in. It is also serving as a distribution center for the Rockwell organization.

The plant will eventually produce valves in other types and sizes as well as meters and other Rockwell products. By the end of 1954, when full production will be reached, employment is expected to be approximately 150. Present employment is in excess of 100.

The structure cost over $1,000,000, exclusive of plant equipment. The factory area is approximately 112,500 sq. ft., while an office area is approximately 12,000 sq. ft.

P. E. W. Goodwin, Jr., a member of

Rockwell's new Sulphur Springs plant

the Rockwell organization for the past 10 years, has been appointed general manager in charge of operations at the Sulphur Springs plant. Goodwin previously had been manager of outside manufacturing at Rockwell's Oakland, Calif., plant. In that capacity he supervised manufacture of valve parts purchased by Rockwell from outside suppliers.

The new plant will also house research, development, and engineering functions for Rockwell - Nordstrom valves in sizes up to 4 in.

Granberry Elected to Core Lab Board of Directors

R. J. GRANBERRY

R. J. Granberry, of Corpus Christi, Tex., has been elected to the board of directors of Core Laboratories, Inc.

Granberry has been employed by Core Lab since 1941. In 1947, following his service as a field and laboratory engineer in core analysis work, he was appointed district engineer for the company's entire lower Texas Gulf Coast and South Texas operations. He will continue to serve in that capacity from facilities located in Corpus Christi.

New Frank Wheatley Supply Firm Organized in Tulsa

Frank Wheatley Supply Co., specializing in oil industry supplies and equipment, has recently been formed in Tulsa, it has been announced by Frank Wheatley, Jr., president of the new firm.

Officers of Frank Wheatley Supply, besides the president, include: Huber Dye, vice president and general manager; Gus Baker, vice president; and Clarence Hunter, secretary-treasurer. Representatives include: Harold Putnam and John Fitzpatrick, Tulsa, and Lloyd Gray, Bartlesville, Okla.

Lines to be handled include: Frank Wheatley pumps and valves, Goodyear mechanical rubber products, Flexible Tube Corp. products, Fairbanks-Morse electric motors and centrifugal pumps, and Chicago metal hose. Negotiations are in process for additional nationally known lines.

Temporary headquarters for the new concern are at Hale Station, Sand Springs Road, Tulsa. Sales offices are in Houston and Odessa, Tex., Shreveport and Lafayette, La.

Chicago Pneumatic's New Plant in Full Operation

Chicago Pneumatic Tool Co.'s recently completed $4,500,000 plant in Fort Worth is now in full production on a complete line of oil-well drilling equipment for the petroleum industry.

Chicago Pneumatic Tool Co.'s new Fort Worth plant.

Designed and constructed by Walter Kiddie Constructors, Inc., the new 130,500-sq. ft. plant incorporates engineered facilities that give it ample flexibility for current and future operations. The plant consists of three attached buildings: a 120,000-sq. ft. manufacturing building; a 7,000-sq. ft. office building; and a 2,412-sq. ft. cafeteria.

Catts Named to Represent Several Metal Fabricators

Catts Co., Tulsa, has been appointed recently to represent Stupp Bros. Bridge & Iron Co., St. Louis; Cal-Metal Pipe Corp. of Louisiana, Baton Rouge; and De Van-Johnson Co. All of these companies manufacture steel products for the petroleum industry. Stupp Bros. fabricate steel for building and other structures. Cal-Metal manufactures thin and medium-wall welded steel pipe and pressure vessels of stainless and various alloys. De Van-Johnson produces cold-finished steel and alloy bars.

H. P. Catts, Jr., head of Catts Co., until recently was associated with one of the petroleum industry's larger suppliers of buildings and other steel structures.

Rockwell Names Shenkle Division Chief Engineer

William H. Shenkle, a gas products engineer with Rockwell Manufacturing Co.'s Instrument Division at Tulsa, has been named chief engineer of the division.

Shenkle was graduated from Massachusetts Institute of Technology in 1951 with a mechanical engineering degree. From 1942 to 1951 he was employed on a part-time basis in the maintenance and engineering departments of Rockwell's gas meter plant at DuBois, Pa.

Fairchild is Distributor For Grant Oil Tool Co.

B. R. Fairchild has been appointed sales distributor of all Grant oil tools and MacClatchie slush-pump products in the Louisiana oil territory, according to Grant Oil Tool Co., Los Angeles. In his new capacity, Fairchild will operate from headquarters in Lafayette, La. Complete stock of Grant tools as well as MacClatchie pump parts, will be available to oil operators on a round-the-clock service basis. Before establishing the Lafayette distributorship, Fairchild made an extended trip to the Grant and MacClatchie plants in California. He also toured the company branches in Compton, Ventura, Bakersfield, and Long Beach, Calif., and Hobbs, N. M., to familiarize himself with the oil-field operation of Grant drilling equipment.

Bode Named Macco Corp. Secretary

W. G. BODE

The appointment of William G. Bode as secretary of the corporation to succeed William E. Leece, recently resigned, has been announced in Paramount, Calif., by John McLeod, president of Macco Corp. Bode comes to Macco with many years of business administration experience including 17 years with American Bosch Corp. in such capacities as national sales manager of electronic products, export manager, and assistant to the president. For the past 9 years, Bode has been a western senior consultant for Sanderson & Porter, well known management consultants, engineers, and constructors of New York City. During his association with S & P, Bode has conducted business studies in Alaska, Mexico, Costa Rica, and throughout the United States.

Motor Maintenance Named Hall-Scott Distributor

M. (Bink) Manning, president of Motor Maintenance, Inc., Houston, has announced the appointment of his company as distributor for Hall-Scott industrial, marine, and truck engines.

Hall-Scott is one of the nation's oldest engine manufacturers, having developed lines of industrial, marine, and heavy-duty truck engines. Important records for fast, low-cost drilling performance are held by Hall-Scott oilfield engines.

Motor Maintenance, Inc., will sell and service Hall-Scott engines in Louisiana, Oklahoma, New Mexico, Arkansas, and Texas, with the exception of a small area in Southwest Texas. Mid-West Equipment Co., of Odessa, will stock and service these engines in the West Texas-New Mexico area.

American Car & Foundry Changes Company Name

American Car & Foundry Co., originally incorporated in 1899, on June 1, 1954 became A C F Industries, Inc., according to Charles J. Hardy, Jr., president. The change in the name was voted at a special stockholders' meeting, at which time John E. Rovensky, chairman of the board of directors, stated that the new name "was adopted as being more descriptive of the company's present business and future objectives."

Simultaneously with the change in name A F C Industries, Inc., on May 31 acquired for cash the entire assets of W-K-M Co., of Houston, which will in the future be known as W-K-M Manufacturing Co., Inc., and will operate as a wholly owned subsidiary of A C F Industries.

One of the leading manufacturers of high-pressure steel valves for oil-field and pipeline equipment, W-K-M was founded 35 years ago, and will continue in Houston where its present plant covers an area of some six city blocks.

R. A. Preis Joins W. C. Norris Field Staff

Rowland (Sonny) A. Preis, Jr., has joined the field staff of W. C. Norris Manufacturer, Inc., according to Ed Bolger, Norris president. Preis has been added to the South Louisiana territory with headquarters in Lafayette. Before joining Norris, he was with Sabine Supply Co., Gulf Supply, Hughes Tool Co., and Mid-Continent Supply Co. Preis studied petroleum engineering at Texas A. & M.

Lane-Wells Holds Three-Day Conference at Oklahoma City

Service requirements of oil-well operators for 1955 was the subject of discussion at a 3-day management and sales conference held late in May in Oklahoma City by Lane-Wells sales and operating executives.

Under the direction of James D. Hughes, general sales manager, reports of field conditions and well-completion practices to be encountered, during the next 18 months, were explained from information furnished by major oil company engineering departments. In the light of long-range forecasts of greater activity in drilling and production operations, plans were initiated to introduce new and expanded technical services, to be made available during the coming year.

Management representatives from all three Lane-Wells divisions were in attendance, including: J. M. Henderson, Robert E. Bush, R. B. Downing, Ray A. Hancock, and Claude L. Kirkman.

Koppers Co., Inc. Announces Promotions

Four promotions in the chemical and gas department, Engineering and Construction Division of Koppers Co., Inc., were announced recently by G. M. Carvlin, vice president and general manager of the division.

C. W. Fisher, formerly chief, project and technical section, has been named assistant manager of the department to succeed Dr. A. J. Abrams, who resigned.

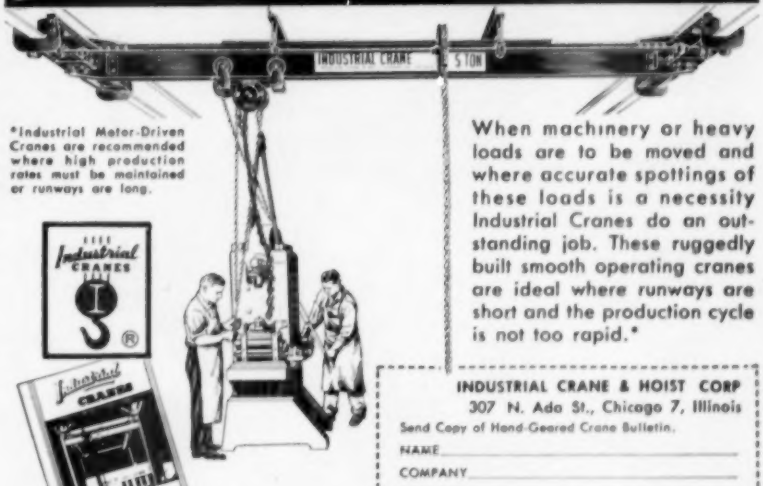
Fisher's vacated post will be filled by J. S. Joseph, formerly assistant chief, who will be replaced in that capacity by G. A. Omohundro, process engineering supervisor.

J. M. Airgood, process engineer, has been appointed process engineering supervisor to succeed Omohundro.

New Lane-Wells Branch Opened at Chanute

The mounting activity in eastern Kansas fields has prompted the opening of a new Lane-Wells branch at Chanute, according to Ed Saye, Kansas district superintendent. The new branch is fully equipped to provide perforating service and radioactivity well-logging service on the usual 24-hour-a-day basis.

USE Industrial FOR HAND GEARED CRANES GREATER ECONOMY



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EXPLORATION

It's Field Trip Time Again

John C. McCaslin

SUMMER is the season for geological field trips for the nation's young geology students. All over the country prospective "rockhounds" are trekking to the various camps set up by universities and colleges. A major trend in geological curricula in the past few years has been the added emphasis placed on field work. Let's see what some of the leading schools in the profession have to offer in the way of field work.

The Canon City embayment area of Colorado seems to be a favorite spot for field work. Field camps are maintained by the University of Oklahoma, the University of Kansas, Iowa State College, and Louisiana State University. The camps of these respective schools are located within only a few miles of each other in a semicircle extending northwest of Canon City to an area a few miles south of Colorado Springs. The embayment offers a fairly complete geologic section from pre-Cambrian to Tertiary, with enough folding and faulting to give the students an idea of what such features look like in the field. Various side trips are taken to the geologic wonders in Colorado during the month or so spent at the camps.

Oklahoma . . . The School of Geology at the University of Oklahoma offers four summer field courses, three of which are held in the Canon City area. One course is offered in the Criner Hills, south of Ardmore, Okla., which is a region including the Arbuckle Mountain section in miniature and is somewhat more complicated stratigraphically. One of these trips is required for the B.S. degree in Geology or Geological Engineering. Advanced work in either area is also offered, paving the way for a Master's degree.

The purpose of these field trips is to permit the student to see and study structure and stratigraphy in the field. This is done by detailed mapping, using aerial photographs as base maps. The student must prepare a geological report in which he discusses in detail the structure and stratigraphy of the area mapped. Another important objective of the course is to see how well the man works with the other members of the small group with which he is associated. The instructor becomes more aware of the student's ability, practicality, and cooperativeness on these trips.

Kansas . . . At the University of Kansas required field trips take undergraduate students to the Arbuckle Mountains for structural geologic study, to the Ozark and Tri-State mineral region, and to Magnet Cove near Little Rock. The university requires a 5-week summer course at its permanent field camp near Canon City.

Colorado . . . Two field trips are required by the Department of Geology for seniors at the Colorado School of Mines. One week is spent in the fall

Several leading geology schools maintain summer field camps in the Canon City embayment area of Colorado.

in Utah's Uinta basin. The purpose of this trip is to familiarize the student with regional reconnaissance evaluation. This trip is designed for the petroleum geologist. The mining geologists at the school visit several classic mining areas in Colorado. In the spring a 3,000-mile trip takes the petroleum geologists to New Mexico and Arizona for 2 weeks. Emphasis on this trip is placed on structure, stratigraphy, geomorphology, and visits are made to mines, oil fields, and industrial plants of various types.

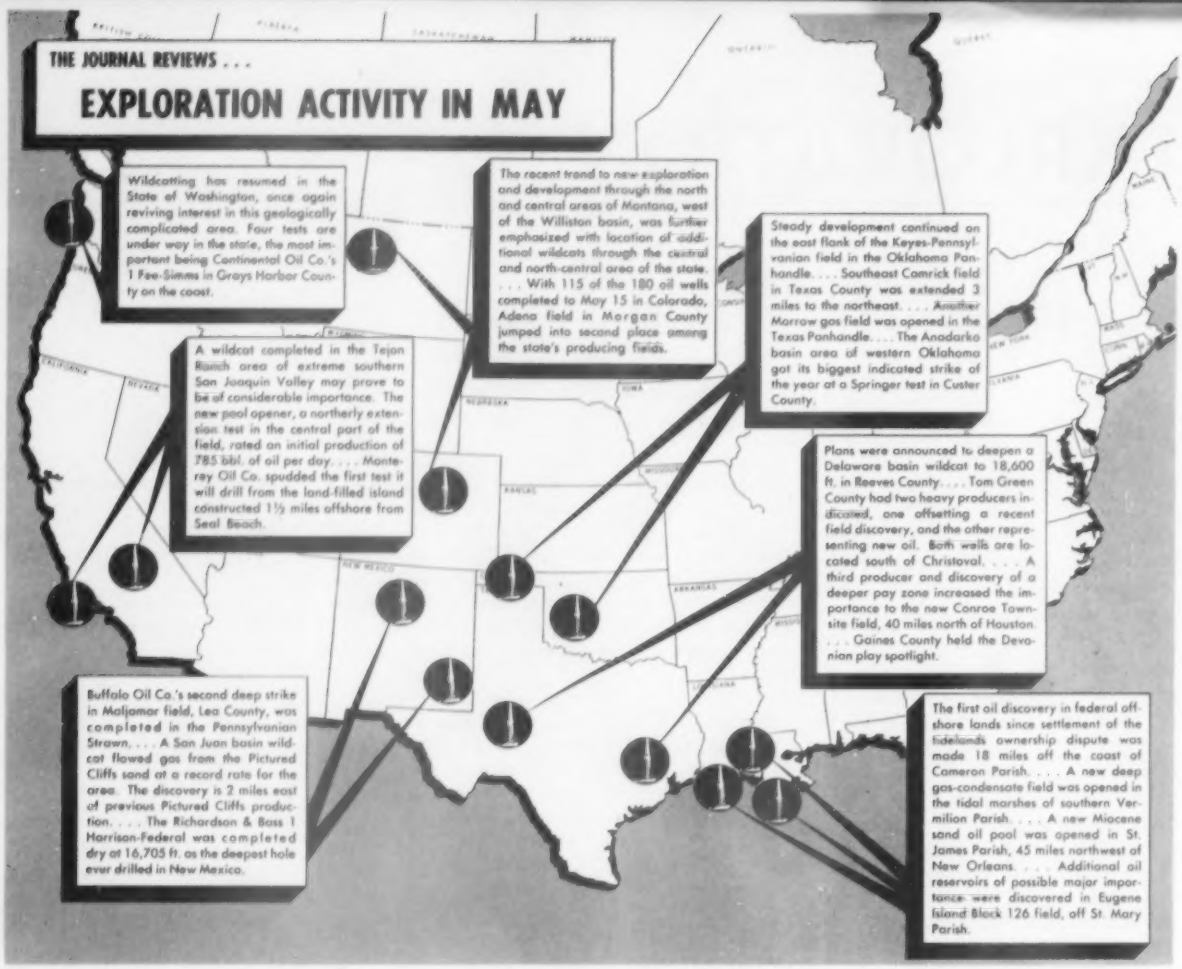
Texas . . . The University of Texas has one of the best field programs in the country. An experienced staff has as its aim the best possible training ground for field work.

The elementary field geology course at Texas is required for the B.S. degree in geology. It is given in the Central Mineral Region of Texas near Llano, Burnet, Mason, and Fredericksburg. One of two other trips is required for the B.S. degree at the university. One course is given in north-central Texas, emphasizing Paleozoic geology, while the other is given in southeastern Texas, emphasizing Tertiary geology. An advanced field geology course is offered at the university. The students go to West Texas for original investigations of the complex geology there. The results of the work are to be reported subsequently in a Master's thesis.

Conclusion

These field trips are set up with a major goal in mind . . . more fundamental field work with a better understanding of field relationships. Geology is an outside and physical science. The students are taken directly to the scene. By seeing textbook material firsthand, and by working out field problems right on the spot, today's geology students are preparing themselves in a well-rounded manner to take their place in the industry.

The importance of field work can never be over-emphasized. With this fact in mind the geology departments of the various institutions are constantly improving their field facilities. The student returns from his trip with a whole new slant on geology. His group work in the field, his working out the various field problems encountered, and the subsequent report of his undertakings are an invaluable aid in broadening his knowledge of geology and his future ability.


THE JOURNAL REVIEWS . . .
EXPLORATION ACTIVITY IN MAY
Wildcatting has resumed in the State of Washington, once again reviving interest in this geologically complicated area. Four tests are under way in the state, the most important being Continental Oil Co.'s 1 Fee-Simms in Grays Harbor County on the coast.
A wildcat completed in the Tejon Ranch area of extreme southern San Joaquin Valley may prove to be of considerable importance. The new pool opener, a northerly extension test in the central part of the field, rated an initial production of 785 bbl. of oil per day. . . . Monterey Oil Co. spudded the first test it will drill from the land-filled island constructed 1½ miles offshore from Seal Beach.
Buffalo Oil Co.'s second deep strike in Maljamar field, Lea County, was completed in the Pennsylvanian Strawn. . . . A San Juan basin wildcat flowed gas from the Pictured Cliffs sand at a record rate for the area. The discovery is 2 miles east of previous Pictured Cliffs production. . . . The Richardson & Bass 1 Harrison-Federal was completed dry at 16,705 ft. as the deepest hole ever drilled in New Mexico.
The recent trend to new exploration and development through the north and central areas of Montana, west of the Williston basin, was further emphasized with location of additional wildcats through the central and north-central area of the state. . . . With 115 of the 180 oil wells completed to May 15 in Colorado, Adena field in Morgan County jumped into second place among the state's producing fields.
Steady development continued on the east flank of the Keyes-Pennsylvanian field in the Oklahoma Panhandle. . . . Southeast Comrick field in Texas County was extended 3 miles to the northeast. . . . Another Morrow gas field was opened in the Texas Panhandle. . . . The Anadarko basin area of western Oklahoma got its biggest indicated strike of the year at a Springer test in Custer County.
Plans were announced to deepen a Delaware basin wildcat to 18,600 ft. in Reeves County. . . . Tom Green County had two heavy producers indicated, one offsetting a recent field discovery, and the other representing new oil. Both wells are located south of Christoval. . . . A third producer and discovery of a deeper pay zone increased the importance to the new Conroe Townsite field, 40 miles north of Houston. . . . Gaines County held the Devonian play spotlight.
The first oil discovery in federal offshore lands since settlement of the tidelands ownership dispute was made 18 miles off the coast of Cameron Parish. . . . A new deep gas-condensate field was opened in the tidal marshes of southern Vermilion Parish. . . . A new Miocene sand oil pool was opened in St. James Parish, 45 miles northwest of New Orleans. . . . Additional oil reservoirs of possible major importance were discovered in Eugene Island Block 126 field, off St. Mary Parish.

Offshore Drilling in News

John C. McCaslin

OFFSHORE developments took the exploratory spotlight away from other areas in May. Important developments, however, were noted in New Mexico, California, the Hugoton embayment area, the Anadarko basin, West Texas, the State of Washington, and the Rocky Mountain region. The month's highlights are pinpointed on the map.

Total completions in May in the United States showed a slight drop from the previous month. Wildcat completions totaled 872 wells, down 21 from April.

Coastal Louisiana . . . The first offshore oil discovery since settlement of the tidelands dispute was made by Magnolia Petroleum Co. at 1-A Lease 1153, Block 110, West Cameron area.

The wildcat discovery flowed oil at the rate of 406 bbl. per day from the Miocene sand. The strike is located about 10 miles northeast of a shut-in gas-condensate field in Block 149, discovered by Superior Oil Co. in 1949.

Other Louisiana Gulf Coast developments included discoveries in Vermilion, St. James, and offshore from St. Mary Parish. Texas Crude Oil Co. 1 Albritton, in the tidal marshes of southern Vermilion Parish, is a new deep gas-condensate pool, 25 miles southwest of Abbeville in the White Lake area. Production is from Miocene sand at 12,308-406 ft. Union Oil Co. of California 1 Karstein in St. James Parish was completed for 175 bbl. of 39°-gravity oil per day for a new discovery along the Mississippi River. The Miocene strike is located on the Richbend prospect, just west of Lagan community on the east bank of the river.

A new discovery well, the Magnolia 4-F State Lease 691, on the north side of Eugene Island Block 126 field, 30 miles off St. Mary Parish, logged about 800 ft. of net effective oil-saturated sand in a total of 17 different zones.

New Mexico . . . Buffalo Oil Co.'s 25-A Baish, about 1 mile northwest of a 1952 Devonian strike, was finaled flowing 920 bbl. of oil per day from the Strawn.

Other recent Pennsylvanian discoveries in southeastern New Mexico are: Stanolind Oil & Gas Co. 1-AB State in Red Lake field, which flowed 810 bbl. of oil daily from the Pennsylvanian and Skelly Oil Co. 6-A Lynch in Fren field, which made an initial potential of 196 bbl. of oil daily from deep Pennsylvanian pay. Fields along the Northwest Platform, with the exception of these three strikes, produce from the Delaware, or Yates, sand of the Upper Permian, to the Clear Fork (Middle Permian).

In the eastern San Juan basin area of New Mexico Phillips Petroleum Co.

Total May Completions, Exploration and Development

	Total comp.	Oil	Gas	Dry	Under 2,500 ft.	2,500-5,000 ft.	5,000-7,500 ft.	7,500-10,000 ft.	10,000-12,500 ft.	Over 12,500 ft.	Total footage	Rigs and drilling
Ala.-Ga.-Fla.	7	0	0	7	0	1	5	1	0	0	40,934	12
Arkansas	36	17	3	16	5	18	9	4	0	0	158,498	44
California	199	149	3	47	56	84	28	18	10	3	847,478	214
Colorado	153	63	13	77	1	12	135	5	0	0	848,882	124
Illinois	249	141	0	108	99	150	0	0	0	0	618,655	396
Indiana	63	22	0	41	54	9	0	0	0	0	107,822	105
Kansas	360	190	34	136	44	310	6	0	0	0	1,216,041	433
Kentucky	92	42	7	43	64	28	0	0	0	0	182,180	154
Louisiana	294	214	17	63	108	18	29	53	63	23	1,905,022	409
North	145	115	14	16	108	12	12	8	4	1	413,985	162
South	149	99	3	47	0	6	17	45	59	22	1,491,037	247
Michigan	46	23	0	23	25	15	6	0	0	0	120,467	139
Mississippi	37	16	1	20	0	1	18	13	5	0	282,792	38
Montana	22	10	0	12	6	9	5	1	1	0	91,823	53
Nebraska	32	12	2	18	1	13	18	0	0	0	164,469	49
New Mexico	60	34	16	10	11	15	17	8	4	5	360,451	123
New York	51	25	0	26	50	1	0	0	0	0	34,118	35
North Dakota	27	18	0	9	0	6	1	18	2	0	203,963	38
Ohio	106	57	12	37	61	44	1	0	0	0	215,872	173
Oklahoma	704	455	22	227	274	302	82	40	5	1	2,399,361	1,316
Pennsylvania	156	37	59	60	97	13	46	0	0	0	526,234	190
South Dakota	0	0	0	0	0	0	0	0	0	0	0	4
Texas	1,492	861	63	568	385	536	361	161	37	12	6,773,433	1,180
N. Central (7-B & 9)	544	288	3	253	262	196	82	4	0	0	1,687,607	325
West (7-C & 8)	352	247	8	97	44	117	108	54	19	10	1,984,779	377
Panhandle (10)	80	54	13	13	1	76	2	1	0	0	284,045	33
East (5 & 6)	84	33	10	41	12	27	31	14	0	0	449,555	67
Gulf Coast (2 & 3)	217	116	19	82	19	45	75	64	12	2	1,399,972	210
Southwest (1 & 4)	215	123	10	82	47	75	63	24	6	0	967,475	168
Utah	5	0	3	2	0	2	2	1	0	0	27,337	38
West Virginia	43	2	33	8	24	18	0	1	0	0	118,002	194
Wyoming	103	79	1	23	6	32	55	9	1	0	565,616	229
Miscellaneous	0	0	0	0	0	0	0	0	0	0	0	§13
Total May 1954	4,337	†2,467	289	*1,581	1,371	1,637	824	333	128	44	17,809,450	‡5,703
Total April 1954	4,395	2,486	286	1,623	1,357	1,783	810	298	111	36	17,587,231	5,736
Cumulative 1954	21,663	12,284	1,473	7,906	6,526	8,575	4,084	1,600	634	244	89,314,087	.....
Cumulative 1953	19,384	10,005	1,538	7,841	5,700	8,146	3,380	1,431	554	173	79,376,314	.....
Western Canada	145	72	11	62	23	71	41	10	0	0	619,658	.....
Alberta	70	43	5	22	4	21	36	9	0	0	372,674	.....
Saskatchewan	60	23	2	35	14	43	3	0	0	0	194,210	.....
Manitoba	9	6	0	3	4	5	0	0	0	0	21,211	.....
B.C.-N.W.T.	6	0	4	2	1	2	2	1	0	0	31,563	.....

*Incl. 82 service wells: Calif. 1, Kans. 5, N. Y. 24, Ohio 5, Okla. 21, Pa. 25, W. Tex. 1. †Incl. 46 condensate wells: N. La. 2, S. La. 14, Miss. 6, Okla. 8, N. Tex. 2, E. Tex. 2, Tex. Gulf 7, S. W. Tex. 5. ‡Incl. all wells rigged up and/or drilling at month's end. §Incl. Nev. 13.

...The Month's Wildcats

	Total	Oil	Gas	Dry	Footage	1954 Comp.	1954 (1,000 ft.)	1953 Comp.	1953 (1,000 ft.)
Ala.-Ga.-Fla.	7	0	0	7	40,934	43	244	38	203
Arkansas	13	5	2	6	61,802	57	238	39	161
California	39	5	0	34	204,276	244	1,202	274	1,258
Colo.-Utah-Wyo.-Mont.	87	8	3	76	510,646	358	2,059	229	1,317
Tri-States	52	3	0	49	92,873	309	582	358	714
Kansas	55	5	1	49	207,289	270	1,053	388	1,446
Louisiana	46	18	3	25	454,276	203	1,933	185	1,645
North	10	1	3	6	73,952	53	313	56	310
South	36	17	0	19	380,324	150	1,620	129	1,335
Michigan	20	3	0	17	41,046	105	223	97	250
Mississippi	14	1	0	13	106,641	61	415	86	614
Nebraska	17	1	1	15	85,192	55	288	64	331
New Mexico	8	1	2	5	60,520	70	552	68	435
North Dakota	9	0	0	9	44,771	32	183	23	137
Oklahoma	62	10	3	49	270,864	318	1,395	327	1,455
South Dakota	0	0	0	0	0	7	32	3	13
Texas	427	58	9	360	2,077,794	2,142	10,611	2,212	10,666
North Central	160	18	0	142	544,656	872	3,031	911	3,203
West	87	18	2	67	530,183	411	2,472	352	2,031
Panhandle	13	0	1	12	69,399	38	225	13	67
East	28	2	0	26	130,979	119	670	130	645
Gulf Coast	64	9	4	51	463,899	335	2,497	377	2,669
Southwest	75	11	2	62	338,678	367	1,716	429	2,051
Others	16	1	6	9	68,174	56	245	48	182
Total May 1954	872	119	30	723	4,327,098	4,330	21,255	4,439	20,827
Total April 1954	893	125	27	741	4,205,737	.....	.....	.....	.....
Cumulative 1954	4,330	626	133	3,571	21,255,229	4,330	21,255	.....	.....
Cumulative 1953	4,439	647	172	3,620	20,827,447	.....	.....	4,439	20,827

1 Indian E reported a daily potential based on a 3-hour test of more than 20,000 M.c.f. of gas per day. This is the largest gage ever obtained from the Pictured Cliff's sandstone in the basin. Recent exploration in the basin has pushed steadily eastward.

California . . . A 5,700-ft. wildcat discovery made by Reserve Oil & Gas Co. in the Tejon Ranch area of the state promises to be of major importance.

The well is producing from Olcese (Miocene) sands through perforations at 5,657-5,743 ft. This is the deepest pay so far found in the field. This new successful strike is expected to be Reserve's first step in evaluating the new discovery.

Hugoton area . . . Drilling activity is on the increase on the east flank of the large Keyes District in northeastern Cimarron and northwestern Texas counties, Oklahoma Panhandle.

The field is fast developing into the largest Pennsylvanian field in area in the Hugton embayment. Cities Service Oil Co. recently opened oil production in the area. Cabot Carbon confirmed and extended this production 1 mile to the southeast. Production is from lower Purdy sand perforations. Continued drilling may connect this area with Northwest Eva field which has comparable oil and gas production.

United Producing Co. 1 Sillars, 13 miles southeast of Hardesty in Texas County flowed an estimated 25,000 M.c.f. of gas per day from the Morrow sand to extend Southeast Camrick field 3 miles northeast.

Another Morrow sand gas discovery was made in central Hansford County, Texas Panhandle, further enhancing the great interest in this new Pennsylvanian area. R. H. Fulton's 1 Matthews flowed 3,025 M.c.f. of gas per day. The well is 4 miles east of Douglas (Pennsylvanian) sand production and 6 miles west of Morrow sand gas production.

Anadarko basin . . . Magnolia Petroleum Co. 1 Jones in Custer County, Oklahoma, is a prospective Springer sand discovery in a remote wildcat area of the basin.

The indicated gas-condensate strike is midway between new deep East Bessie pool in Washita County and Mayor County's Northeast Seiling pool on the Dewey-Major County line.

West Texas . . . Gulf Oil Corp. is deepening its 1 Northrup in Reeves County, 24 miles southeast of Pecos in the southeastern portion of the Delaware basin. Present plans call for drilling and testing to 18,600 ft. The wells old total depth, 16,696 ft., was a depth record for the Texas portion of the Permian basin area.

Humble Oil & Refining Co. 1 Funk, ⅜ mile southeast of Stanolind 1 Hoblett & Jacobs Ranch Co., recent field discovery, is a new Strawn discovery in Tom Green County, and confirms the Stanolind well. The Stanolind strike flowed 242 bbl. of oil from Strawn reef pay in March. Nearest similar production is the Cox-Brown field, 3½ miles due south in Schleicher County.

Caroline Hunt Trust Estate 1 Jacobs, new discovery 1½ miles south of Christoval and north of Humble's well, made a heavy flow of oil on drill-stem test in the Strawn lime before being shut-in due to fire hazard.

The spotlight on deep drilling in the Midland basin moved north into Gaines County. Felmont Oil Corp. et al 1 Terrell CSL, extension and confirmation well to Amerada and Rowan 1 Brunson, opener of Sara field, rated a daily potential of 1,678 bbl. of oil on the basis of a 6-hour test. The 1 Terrell ran high on the Devonian, correlated with the discovery well of Sara field, and indicates a major Devonian structure. Location is in southeastern Gaines County, between Glasco-Devonian pool and big Seminole field.

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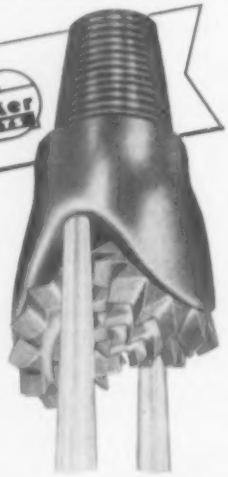

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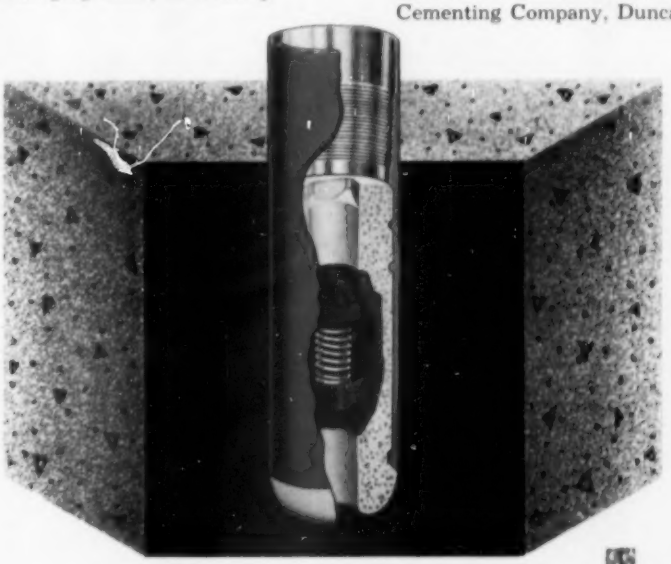

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HUGOTON EMBAYMENT

First Cherokee Sand Oil Pay in Northwest Eva Field

First Cherokee (Pennsylvanian) sand oil production has been opened in Texas County, Oklahoma's Northwest Eva field by Gulf Oil Corp.

The 1 Hixon, NE NW 11-4n-10eCM, flowed 322 bbl. of oil per day through 15/64-in. choke from perforations at 4,006-28 ft. (See map.) The south offset to the discovery, the 2 Hixon, flowed an estimated 5,000 M.c.f. of gas per day from the Cherokee. It then flowed oil on a test of the regular field pay, the Morrow sand.

Three wells in the area, originally completed in the Morrow, are testing or will test the new pay in the field. United Carbon Co. 5 Kelley, east offset to the 1 Hixon, is confirming the new Cherokee pay. It flowed 285 bbl. of oil in 24 hours through ¼-in. choke. The 6 Kelley in the field will test the Cherokee also. The Gulf Oil 2 Ferguson, another Morrow producer, is testing for recompletion in the Cherokee.

Texas Panhandle... R. H. Fulton 1 Jackson, 5 miles northwest of Spearman and ¾ mile west of the 1 Matthews, recently completed Morrow sand gas discovery in Hansford County, has indicated what is tentatively identified as Atoka production.

In Sherman County Humble Oil & Refining Co. 1 Dortch, 8½ miles northwest of Stratford, has been completed as a 2½-mile northwest extension to new Stratford gas field. On potential the extension well flowed 1,600 M.c.f. of gas per day from Cisco.

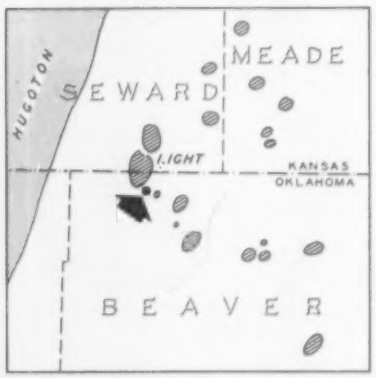
The Texas Co. is testing 1 Sophie Pearson Daniel "A," southwestern Ochiltree County wildcat. Testing is in Ellenburger. Morrow production has been assured after well flowed 1,500 M.c.f. of gas per day.

Southwestern Kansas... A new pay for Hugoton field in Seward County has been completed by Panhandle Eastern Pipeline Co. at 1-4 Boles, old well deepened.

The discovery, 4 miles west of Liberal, flowed 9,700 M.c.f. of gas per day from Toronto (Pennsylvanian). The discovery is 14 miles south of Holt field, another Toronto field inside Hugoton Permian production area.

Morrow Oil Strike Hinted in Beaver

First Upper Morrow sand oil production for northwestern Beaver County's Light field is hinted at J. M. Huber Corp. 1 Zielke, NW NE 28-6n-21eCM (arrowed on map).



The indicated discovery well is on the southwest flank of Morrow sand gas production. Recovery on a drill-stem test at 6,082-6,182 ft. was 930 ft. of oil with some mud-cut oil. The well is 2 miles southwest of the 1 Wallace, SW NW 15-6n-21eCM, completed 3 years ago as a Morrow distillate well.

LOUISIANA

SOUTH LOUISIANA

Bourg Production Spreads

Production in Bourg area, southeast of Houma, on the Terrebonne - Lafourche parish line, spread further to the east with completion the past week by Stanolind Oil & Gas Co. of a gas-condensate well at its 1 Des Roche, in 41-17s-18e. The well's flow at completion was gaged at 21 bbl. of 47.6°-

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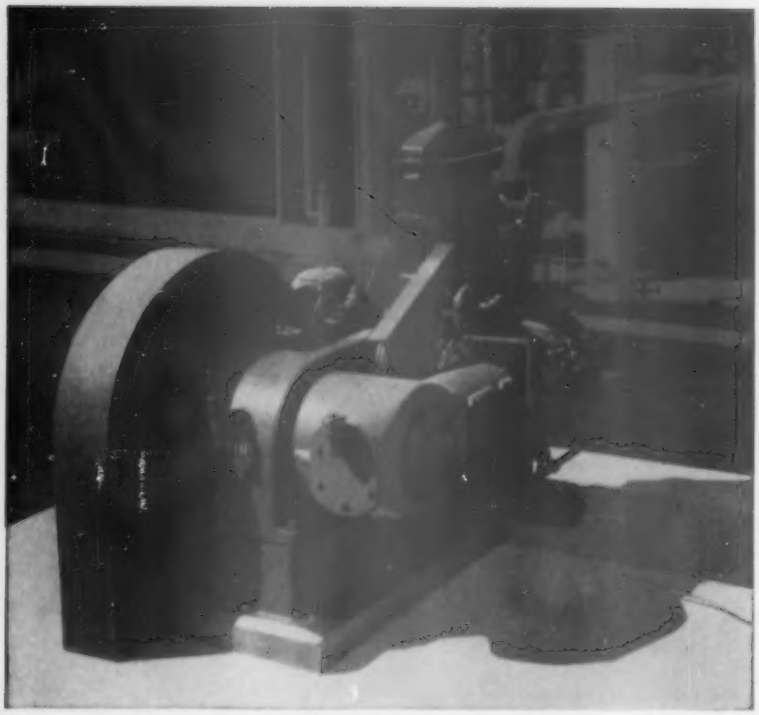

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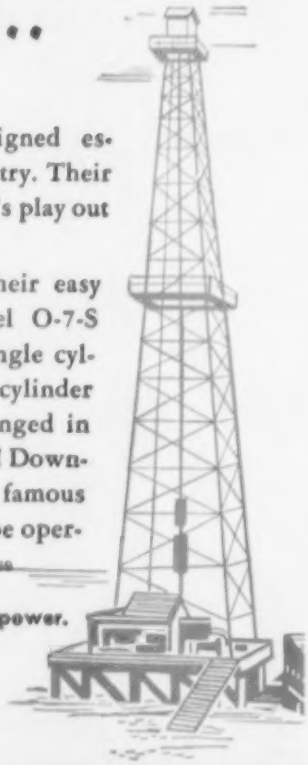

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gravity condensate and 1,327,998 cu. ft. of gas per day through 8/64-in. choke. Flow was under pressure of 3,850 psi. Pay interval is at 11,511-14 ft. Hole was carried to 13,000 ft.

OKLAHOMA

Northeast Purdy Well Reports Springer Flow

Amerada Petroleum Corp. 2 B. Daugherty Unit, C SE NW 12-3n-4w, Garvin County, flowed 393 bbl. of oil in 8 hours into tank. The well flowed natural from Springer sand perforations at 9,517-90 ft. through ¾-in. choke.

On previous tests the well flowed 113 bbl. of oil per hour from Hart sand perforations at 8,612-32 and 8,649-57 ft. after fracturing treatment.

Eola pool . . . Sohio Petroleum Co. 1 Shipley, SE SW SW 8-1n-2w, flowed 282 bbl. of oil in 4½ hours on 11/16-in. choke. It then flowed 62 bbl. of oil in 4 hours on ¼-in. choke. Production is from the McLish sand through perforations at 8,356-8,475 ft. Testing is still under way at the well.

Flow Tests Continue At Oklahoma Strike

Ashland Oil & Refining Co. 1 McNew, Oklahoma County discovery well in the C SE SW 14-11n-1w, tanked 247 bbl. of oil per day on latest gage.

The well is producing from perforations at 6,108-18 ft. in the Misener sand. Testing continues.

Payne County . . . The third operation has been staked in Northeast Pratt pool, a new producing area opened last April by Royal Oil & Gas Co. at 1 Robinson, NE NE NW 28-19n-5e.

The new field has two oil wells currently. The discovery well flowed 58 bbl. of oil in 8 hours on 14/64-in. choke on completion. Viking Oil Corp. 1 Dawes, SE SE SW 21, the north offset, has undergone production tests. The well flowed 22 bbl. of new oil for 10 hours on 20/64-in. choke from treated perforations at 3,418-42 ft. in the Red Fork sand.

Royal Oil & Gas Co. 1 Grauer, SE SW SW 21-19n-5e, is a new operation on the west side of the producing area. On the northeast D&L Oil Co., is below 3,122 ft. at 1 Leka, stepout well in NE SE NE 21-19n-5e. The new pool is southeast of South Garr pool.

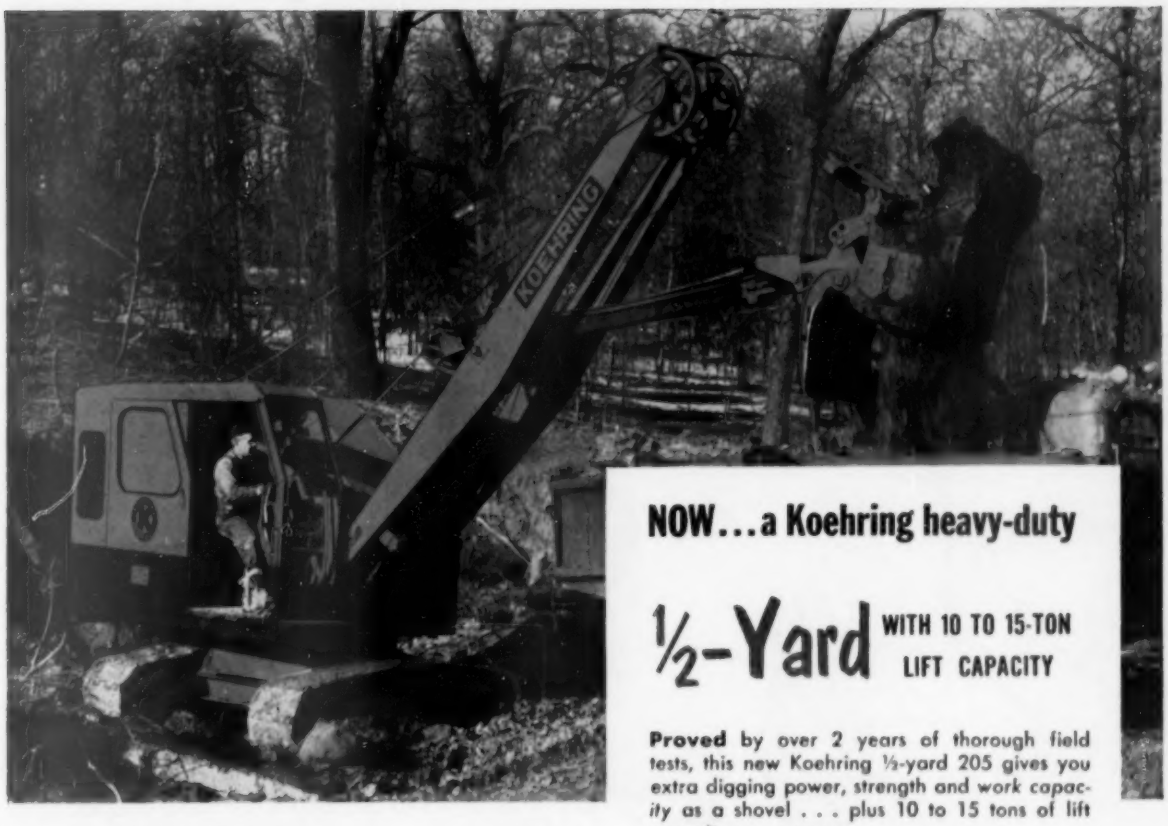
First Production Tests At Garvin County Well

Jake L. Hamon 1 Harrison McGee, C SE SW 24-2n-3w, Garvin County discovery, is undergoing production tests.

The well flowed 336 bbl. of 45°-gravity oil in 24 hours from perforations in the Hart sand at 7,732-46 ft. It is 1 mile south of North Foster pool.

Northeast Purdy pool . . . A good flow rate was established at Amerada Petroleum Corp. 2 B. Daugherty Unit, C SE NW 12-3n-4w. The well flowed 450 bbl. of load oil and 106 bbl. of new oil in 7 hours on ¾-in. choke from the Hart sand. It then flowed 113 bbl. of oil per hour with 240 M.c.f. of gas per day. The Springer has been perforated and crews are washing in.

Grady County . . . Southeast Bradley pool has a new producing well at British Ameri-



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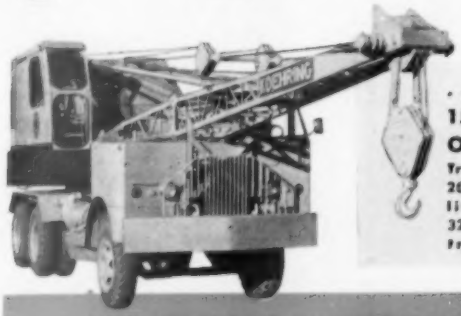

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can Oil Producing Co. 1 Burkes-Morris, C SE NE 12-4n-5w. The well flowed 237 bbl. of oil in 13 hours on 16/64-in. choke from perforations at 9,068-78, 9,080-92, and 9,099-9,122 ft.

New Simpson Strike In Logan County Area

A new Simpson reservoir is indicated in Logan County in the Nemaha granite ridge area of north-central Oklahoma.

Lang & Unger 1 Bohanon, SE NE NW 34-15n-3w, flowed gas at the estimated rate of 100 M.c.f. per day on drill-stem test. Recovery was 430 ft. of clean oil and 298 ft. of heavily oil and gas-cut mud. Another drill-stem test recovered 248 ft. of clean oil, 267 ft. of oil and gas-cut mud and 125 ft. of slightly oil and gas-cut mud. Sample tops indicated that these tests were made in the Simpson. Some believe the pay to be the first Wilcox after studying logs closely.

Holdenville Producing Area Continues Growth

Booch sand production in the general Holdenville area of Hughes County continues its rapid expansion.

Grief Creek and East Holdenville pools were recently connected by the fast development. The state nomenclature committee has given the name East Holdenville pool to the entire area. It now appears that Holdenville pool itself will eventually link up with East Holdenville pool.

Powel Briscoe, Inc., has two wells completing east of Holdenville pool. The 1 McBryde, SW SW NW 5-7n-9e, flowed 3 bbl. of oil per hour with 4,000 M.c.f. of gas per day from perforations at 2,816-38 ft. The 1 Pogue, SW NW NW 5, flowed 16 bbl. of oil per hour for 12 hours on 12/64-in. choke.

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MICHIGAN

The first follow-up test to the new Reynolds field, Reed City zone oil discovery well, Reynolds Township, Montcalm County, the south 40-acre offset to the discovery, was being flowed at a restricted rate of 40 bbl. of oil a day on final completion test, after a 200-gal. acid treatment.

The first offset, McClure Oil Co. et al., 1 Long, SE NE SW 1-12n-10w, although reported to be structurally higher on the Dundee than the discovery, topped pay objective a few feet lower than it was found in the discovery and acid was used to develop flowing production. The 40-bbl. flow rate was a restricted rate of production and operators had previously announced that well would be flowed at about 50 bbl. daily. But a small slug of water, which could not be found in stock storage, however, prompted them to pinch the well back to 40 bbl. where there was no reported evidence of water. The 1 Long logged top of pay zone objective at 3,296 ft. pay at 3,337-38 ft. Hole was bottomed out at 3,338 ft. with well showing for 650 ft. of free oil natural in 12 hours.

Tests of Trenton at the Ferguson & Ferguson 1 Malley, NW SW NE 32-1n-8e, Novi Township, Oakland County, a 2-mile northeast outpost to Northville oil and gas pool, have been disappointing to date. Well was reported to have logged an estimated 2,000-ft. oil and gas fill-up from an open hole in the Trenton at 4,545 ft. But after well was killed with mud, casing was run and cemented, and hole was cleaned out, only a small showing of oil and gas have been found. Hole had been deepened to 4,571 ft. this week, with a possible increase in pay reported. Two bbl. of mud acid were dumped into the hole and the amount of gas showing at the surface after this clean-out operation was reported to have increased.

Gratiot County, long considered to be a dry graveyard in the Michigan basin, came through this week with a Traverse oil well which flowed natural at 10 bbl. of oil an hour.

This new well, in the recently discovered Sumner Traverse oil pool, Sumner Township, was the I. W. Hartman and Columbia Oil & Gas Co. 1 Coburn, SW NE SW 11-11n-4w. Alpena Traverse objective top was logged at 2,806 ft. Hole was drilled to 2,830 ft. where it was bottomed out in a flowing oil pay. Well showed gas for about 90 minutes at the total depth before it filled and started to flow. It produced 60 bbl. of oil in 5 hours through 5-in. casing, and continued to flow at the 10-bbl. an hour rate on later tests. An additional 50-bbl. was produced while tubing was run, during another 5-hour period. Pay showed in samples at 2,829-30 ft. After tubing was run, production was pinched back to about 5 to 6 bbl. an hour. About 280 bbl. of oil had been gathered and hauled from the lease during the first 3 days after flowing production was established.

The Sumner pool was opened with a 30-bbl. oil well after acid late in 1953 by The Moco on acreage farmed from Hartman and Columbia, and lease ownership in the area is fairly evenly checkerboarded between these two operating groups. The discovery producer is located in the SW SE NE 11-11n-4w, and The Moco has another area well, in the NE NW SE 11-11n-14w, between the two producers, which is not showing up too

favorably in the Traverse on test. No new drilling locations had been announced for the area to date, but at least two locations were expected to be staked immediately for early drilling.

CANADA

Gas Discovery Made In Kinmundy Area

Canadian Homestead Oils, Ltd., and West Territories Oils, Ltd., have chalked up a natural-gas discovery at their first wildcat driller in the Kinmundy area of southeast Alberta, 115 miles east of Calgary. During initial drill-stem test of the Viking sand discovery horizon the exploratory well flowed natural gas at rate of 6,000 M.c.f. daily.

The new strike, Homestead-Territories 1 Kinmundy, LSD 5, 4-25-9w5, lies about 2½ miles northeast of Cessford area gas wells, 18¾ miles northeast of basal Colorado oil production in that region, and 16¾ miles northeast of the Steveville Development 4 Viking oil discovery well. Crew cored into the Viking sand at 2,554 ft., or 110 ft. subsea (K.B. elevation 2,444 ft.), and ran initial drill-stem test from 2,550 to 2,574 ft. Natural gas flowed to the surface immediately, at a maximum rate 6,000,000 cu. ft. daily, and 20-minute pipe recovery was 5 ft. of drilling mud. There were 20 ft. of pay section cored and tested at bottom of that drill-stem test. Second test, from 2,574 to 2,592 ft., with valve open 2 hours, gave up a recovery of 265 ft. of salt water. Crew is currently coring in a shale formation at 2,609 ft., an indicated 10 ft. above the top of the main sand section.

This team also has site staked for a second driller on this reservation, Homestead-Territories 2 Kinmundy, LSD 4, 5-25-10w4, which is about 7 miles west of the new gas discovery. The second well is scheduled to be drilled following completion of the initial venture.

The discovery, 1 Kinmundy, is 9 miles east of the Canadian-Delhi 11 Cessford abandonment, nearest previous driller. Cessfor 11 well entered the Viking sand at a subsea elevation of 166 ft., or about 56 ft. lower than the new gas discovery. The Viking oil discovery, 16¾ miles to the southwest, Steveville Development 4, entered the Viking at an elevation of 99 ft., or 11 ft. higher than 1 Kinmundy.

Shaunavon . . . The Tide Water Associated Oil Co. group has discovered medium gravity oil at a wildcat in the Shaunavon area of southern Saskatchewan, it was learned from reliable sources. Participating with Tide Water in this discovery, which lies about 9imles north of Shaunavon, are the Atlantic Refining Co., Columbian Carbon Co., and the Ohio Oil Co.

The new strike came at Tide Water 1 North Shaunavon Crown, LSD 1, 34-9-18w3, which is about 7½ miles east-southeast of the Delhi-Husky-Phillips 1 Rock Creek abandonment, and about that same distance southwest of Socony-Western Prairie 22-10B Instow dry hole.

Although not as yet officially reported by backers of the project, it is understood that a 1-hour drill-stem test in the upper Shaunavon sand section of the Jurassic was run from 4,547 to 4,560 ft. Pipe recovery was reported at 2,940 ft. of oil. A later test, from 4,560 to 4,578 ft., for 1½ hours, yielded 1,500 ft. of gassy oil, the report said. To date the well has indicated about 31 ft. of oil zone in this formation, and hole is being deepened.

Williston basin . . . Canadian Gulf has commenced production tests of its first follow-up to the Mission Canyon oil discovery well in

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the Frobisher area of southeast Saskatchewan, and during an 11-hour test yielded 264 bbl. of oil, or at rate of 576 bbl. daily. There was no formation water, but B.S. cut was 4/10th of 1 per cent.

The new producer is Canadian-Gulf 11 Moffatt, LSD 11, 35-3-4w2, ½ mile east of the 9 Quinn discovery well. In addition to being assured of oil production from the Mission Canyon, the Moffatt well also found oil encouragement higher in the Mississippian, in the Charles member. The Charles has not been production tested.

The Mission Canyon was perforated from 4,654-60 ft., and 500-gal. mud acid wash was applied, prior to production testing. This well indicated about 20 ft. of oil section, while the discovery well showed about 12 ft. of oil pay. A service rig will likely be moved to location, and further production test will be run.

Matzihwin Creek... An absolute open flow potential of nearly 15,000,000 cu. ft. daily has been estimated by engineers at the basal Colorado formation gas well in the Matzihwin Creek area of southern Alberta, backers of that gas strike announced. This well lies on farmout lands from Canadian Homestead Oils, Ltd., near Princess field and about 20 miles north-northeast of Brooks.

The venture, Gulf States 1 Homestead, LSD 10, 31-21-13w4, is ⅜ of a mile southwest of the Toronto Syndicate No. 1 abandonment that found a 2,000,000 cu. ft. per day gas flow in the basal Colorado and a slight oil showing during 1945, and 9 miles west of the Sweetgrass 1 Maygill capped potential gas well. Gas success was assured about a week ago during a drill-stem test from 2,845-70 ft., when flow rate through ½-in. choke was around 6,900,000 cu. ft. daily.

Hole was taken down to 2,927 ft., and string of 5½-in. production casing was set at that depth with 225 sacks of cement. The basal Colorado was then perforated from 2,856-63 ft., with 4 shots per ft. for flow tests. The absolute open flow of about 15,000,000 cu. ft. daily was calculated by Gulf States engineers on the basis of back pressure tests.

KANSAS

New Discoveries

In Southern Kansas' Cowley County K. T. Weideman 1 Hanson, reworked dry hole in SW NW NE 31-33s-3e, is a new Mississippian discovery, opening Southwest Rainbow Bend pool. In the Sedgwick basin Willowdale pool was opened by Aylward Drilling Co. at 1 Amsden, SW SW SW 11-29s-9w, Kingman County. Production is from the Viola.

On the Central Kansas uplift in Pratt County Lario Oil & Gas Co. 1 Moore, SW SW SE 36-28s-14w, is a new Simpson pool, Earl pool. Grove pool was opened in Reno County by Schermerhorn Oil Co. at 1 Morris, CN½ NE NW 12-25s-10w, with Mississippian production. Seevers pool was opened in Stafford County by West-Pan Hydrocarbon Co. at 1 Seevers, SW SE SE 6-25s-13w. Lansing production is assured.

In the Sedgwick basin, Sumner County, South Haven pool was opened by Herndon Drilling Co. at 1 Yearout in SW SW NW 2-35s-1w. Production is from Simpson and Lansing. Chickasha pool was opened at 1 Muhlenbruch in NW NW SE 5-33s-3w, by Beardmore Drilling Co. Production is from the Lansing.

Greenland Drilling Co. 1 Hill is a new discovery in Sumner County, opening West Padgett pool in NW NW SE 21-34s-2e. It was completed for 25 bbl. of oil per day from the Lansing.

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TEXAS

WEST TEXAS

Dora Roberts Area Gets Third Ellenburger Well

Cities Service Oil Co. 1 Parks, promising new discovery or north extension to Ellenburger production in Virey field, reported a heavy flow of oil on drill-stem test in the Ellenburger. If completed in the Ellenburger, it will be the third Ellenburger strike on or directly adjoining the Dora Roberts Ranch land being explored by Forest Oil Corp. and Cities Service. Location of 1 Parks is 1⅜ miles north of Ellenburger oil at Virey field, and 4⅜ miles north of 1 Dora Roberts C-4, discovery on the ranch.

Operators at 1 Parks drilled into the Ellenburger, by samples, at 13,018 ft., minus 10,140 ft., compared with a minus datum point of 10,396 ft. at Warren Petroleum Corp. 1 Wallin, Ellenburger discovery in Virey field.

No. 1 Parks' first test of the Ellenburger was between 13,010-70 ft. Water blanket and gas surfaced in 20 minutes, mud in 29 minutes and oil in 30 minutes. The well flowed 256.88 bbl. of 51° oil in 2 hours, which was broken down into 142 bbl. the first hour and 114.88 bbl. the second hour. Choke size was not reported. Flowing pressure ranged from 3,215-5,055 psi., and 20-minute shut-in pressure reached 5,690 psi. Gas-oil ratio was 1,100 cu. ft.

Gaines County discovery... Honolulu Oil Corp. 1 Wescott, 6 miles southeast of Seminole, was reported to be flowing at the rate of 40 bbl. an hour on drill-stem test in the lower Pennsylvanian. The high flow came on a test between 11,002-25 ft., which was still in progress at this report.

Previously the well flowed oil at the rate of 15 bbl. an hour from the interval at 10,985-11,005 ft. On this test, water blanket flowed in 1 hour and 23 minutes and oil in 1½ hours. Flowing pressure ranged from 960-2,200 psi. and 30-minute shut-in pressure was 4,520 psi. Core recovery from 11,005-25 ft. recovered 18 ft. of lime, of which only the 3 top feet had oil shows.

The two sections above are the first in the Pennsylvanian to flow oil. Other sections, from 10,189 ft., have developed free oil but did not flow. The well has also had good oil shows in the San Andres and in the Wolfcamp.

Andrews County... Ralph Lowe had another flush Ellenburger discovery in central Andrews County at 1 Southland Royalty in 21-A46-PSL Survey, south of Permian production in Deep Rock field, and 2 miles south of the same firm's 1 Deep Rock which was an Ellenburger discovery earlier this year.

Tentative top on the Ellenburger at 1 Southland Royalty was 12,156 ft., which checks 41 ft. high to the 1 Deep Rock on the north. First test, between 12,160-12,209 ft. had flowing oil in 1 hour and 35 minutes and gaged 37 bbl. of oil with no water during the last 70 minutes of the test. Flowing pressure ranged from 385-3,400 psi. and 30-minute shut-in pressure was 5,150 psi.

On test between 12,207-36 ft. the well had oil in 19 minutes and tanked 125 bbl. of oil in 1 hour through 1-in. top choke. Surface flowing pressure was 200 psi.

Operators cored ahead to 12,294 ft. and ran a 3-hour test between 12,238-94 ft. It did not flow on this test but was still above the water, and tests were stopped to run electrical surveys. The last drill-stem test had gas in 15 minutes and reversed out 28 bbl. of oil.

SOUTHWEST TEXAS

Dual-Zone Well Opens New Sand at Borregos

Humble Oil & Refining Co. has added another oil-producing lense in its Borregos field, northern Kleberg County. The new pay, in Zone N-13, is in the company's 129 King Ranch-Borregos, dually completed in that pay, at 6,306-16 ft., and in a deeper zone (Zone R-5) at 6,906-16 ft. Flow from the new pay was gaged at 73.09 bbl. of 37°-gravity oil daily through chokes with pressure of 700 psi. and gas-oil ratio of 705 cu. ft. per barrel. The deeper pay produced at the rate of 178.68 bbl. of 39.6°-gravity oil per day.

New Shallow Pool Found

Harold K. Boysen and associates are opening a new shallow producing area about 2 miles northwest of Moca field, in Webb County. Discovery well is their 1 Niles, which filled 540 ft. of clean oil on a 33-minute drill-stem test, using ⅝-in. bottom and ¼-in. top chokes. Sand, at 633-42 ft., is believed to be upper Miocene. The area is about 30 miles northeast of Oilton on a Cities Service Oil Co. farmout in Survey 2326.

New Producer Confirms Bexar Chalk Discovery

Discovery last month of Austin chalk production in the area 3½ miles southeast of Elmendorf, in southeastern Bexar County, has been confirmed by the area's second well,

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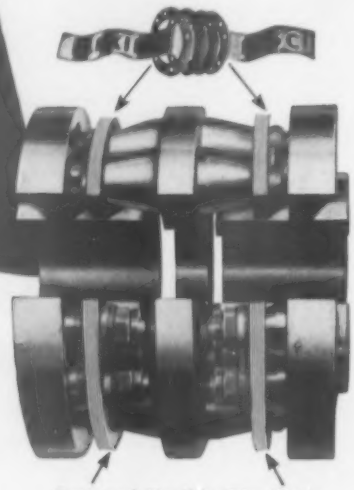

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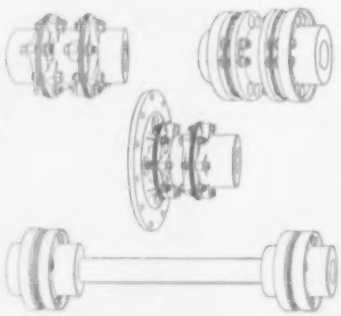

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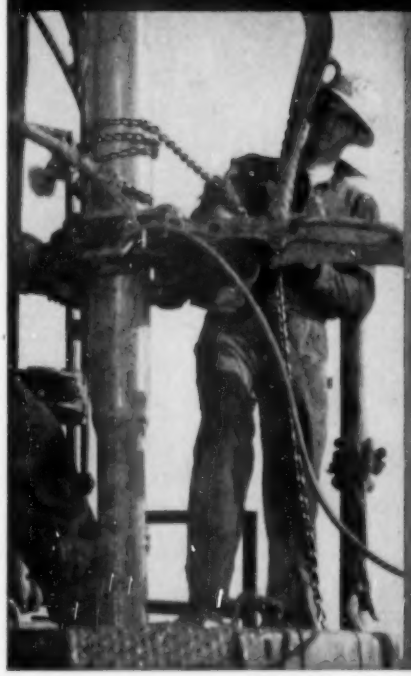

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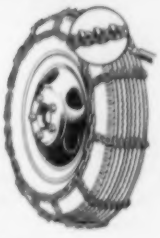

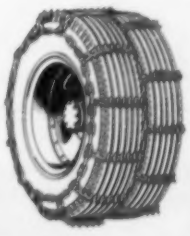

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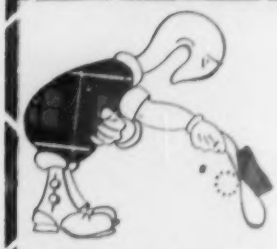

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located 650 ft. northwest of the initial producer.

The new well, drilled by H & J Drilling Co. at 1 Miller, in Mariana Seguin Survey, is completed on the pump good for 177.55 bbl. of 36°-gravity clean oil per day. Pay is in open hole at 2,870-2,942 ft. The discovery well, B. M. Jacobs 1 Hartl, flowed initially at the rate of 267.3 bbl. of pipeline oil through ¼-in. choke from open hole at 2,900-3,037 ft.

TEXAS GULF COAST

Second Well Confirms Hornberger Discovery

Hornberger field, on the Jackson-Wharton county line, got its second producer the past week, confirming a Frio oil-discovery made in January 1953.

The new producer, Caribbean Oil Corp. 1 Hudgins, completed for 47 bbl. of 25.9°-gravity oil per day through 10/64-in. choke from perforations at 5,469-73 ft., is 1,320 ft. northeast of the discovery well, on the Wharton County side of the line.

The discovery well, Highland Oil Co. 1 Hudgins, on the Jackson side, had an initial flow of 182 bbl. through 13/64-in. choke with perforations at 5,443-72 ft. Since its completion, a dry hole has been drilled 3,000 ft. to the west.

The area is 8 miles south of Louise, and midway between Louise and Mayo fields.

Gas-Condensate Producer Opens New Garwood Field

C. H. Osmond and associates' new gas-condensate discovery well, 1 Lehrer, northeast of Garwood, in Colorado County, has been completed with a calculated open-flow potential of 21,000,000 cu. ft. of gas per day. Condensate content was in the ratio of 36,900 cu. ft. of gas per barrel. Condensate gravity tested 49.8°. Shut-in pressure gaged 4,742 psi.

Completion in the Wilcox sand, perforated at 9,685-9,705 ft. Hole had been drilled to 9,708 ft. The discovery is west of the Kennelly gas area.

New West Bernard Well Extends Gas Production

Gas flow at Ada Oil Co.'s new extension well on the southeast side of the West Bernard area, of Wharton County, was at the rate of 13,700,000 cu. ft. per day when opened the past week for potential gaging. Flow carried a spray of 57.5°-gravity condensate, gas-condensate ratio being 38,100 cu. ft. per barrel. Pressure, with well shut in, is 2,272 psi.

The well is completed in the field's Clodine sand with perforated interval at 7,086-91 ft. It is 3,400 ft. from nearest production. The area is 15 miles southwest of East Bernard.

New Oil Area Opened in Eastern Harris County

Ohio Oil Co. has opened a new oil field 3 miles southeast of Deer Park, east of Houston, in eastern Harris County, where its 1 Dwyer et al. was completed the past week with a potential of 174.5 bbl. of 43.5°-gravity oil per day, flowing through 9/64-in. choke. Flowing pressure gaged 950-psi. pressure on the tubing with gas-oil ratio of 505 cu. ft. per barrel.

Production is from a sand interval at 7,012-22 ft. in hole drilled to 8,440 ft. Location is 3½ miles north of Clear Lake field, and about the same distance south of the Lynchburg gas area.

Production at Lemonville Extended Mile Southward

Production in the Lemonville area, Orange County, has been extended a mile to the south with the completion by Houston Oil Co. and American Republics Corp. of their 1-A Lindsey et al. in the Josiah Reeves Survey.

Flow, on potential gage through 6/64-in. choke, was at the rate of 65.28 bbl. of 42.4°-gravity net oil per day with tubing pressure at 1,875 psi. Gas-oil ratio gaged 3,871 cu. ft. per barrel. Total fluid had a 45 per cent water cut.

Pay is in the Nodosaria zone, opposite which casing is perforated at 7,788-91 ft.

EAST TEXAS

Deep Well Scheduled For Smith County

Continental Oil Co. will drill an 8,800-ft. wildcat in east-central Smith County, 4 miles northwest of Overton, which lies between the East Texas field and the Chapel Hill field.

The new project, which is expected to penetrate the Travis Peak, will be drilled as 1 Mayfield Co., on a 191-acre tract in the S. L. B. Jasper Survey, A-515.

Sinclair Oil & Gas Co. 1 Thompson, Smith County deep wildcat 3½ miles east of Troupe, had drilling under way and was below 2,055 ft. at this report.

Shelby County location . . . H. J. Chavanne, Houston, has filed application to drill 1 R. C. Adams as an 8,000-ft. wildcat 6½ miles northwest of Center in Shelby County. Location is in the Benjamin White Survey, A-762. Prince Drilling Co. will move in and drill.

Cherokee County . . . Eugene Talbert and P. G. Lake, Inc., will drill 1 Carl O. Nyman as a 5,400-ft. Woodbine wildcat 2 miles west of production in North Jacksonville field. Location is in the John Moffatt Survey, A-610.

KENTUCKY

EASTERN KENTUCKY

In the Floyd County sector of Big Sandy gas field, Kentucky West Virginia Gas Co. has completed 1022 M. B. Williams as a shallow Maxon (Mississippian) gas well. A natural open flow of 582,000 cu. ft. of gas daily was had from sand topped at 785 ft. and drilled to 841 ft. total depth.

APPALACHIAN AREA

PENNSYLVANIA

In Unity Township, Westmoreland County, Southwest Pennsylvania, Peoples Natural Gas Co., will plug and abandon 1-4019 A. W. Kintz, deep wildcat resulting in a dry hole. A rotary rig had been moved to this well at a depth of 6,324 ft., and completed at a depth of 8,554 ft. Monroe Township, Bedford County, John Galey 1 Donald H. Miller, drilling at 3,638 ft.

WEST VIRGINIA

In Middle Fork district, Randolph County, West Virginia, Washington Natural Gas Co.

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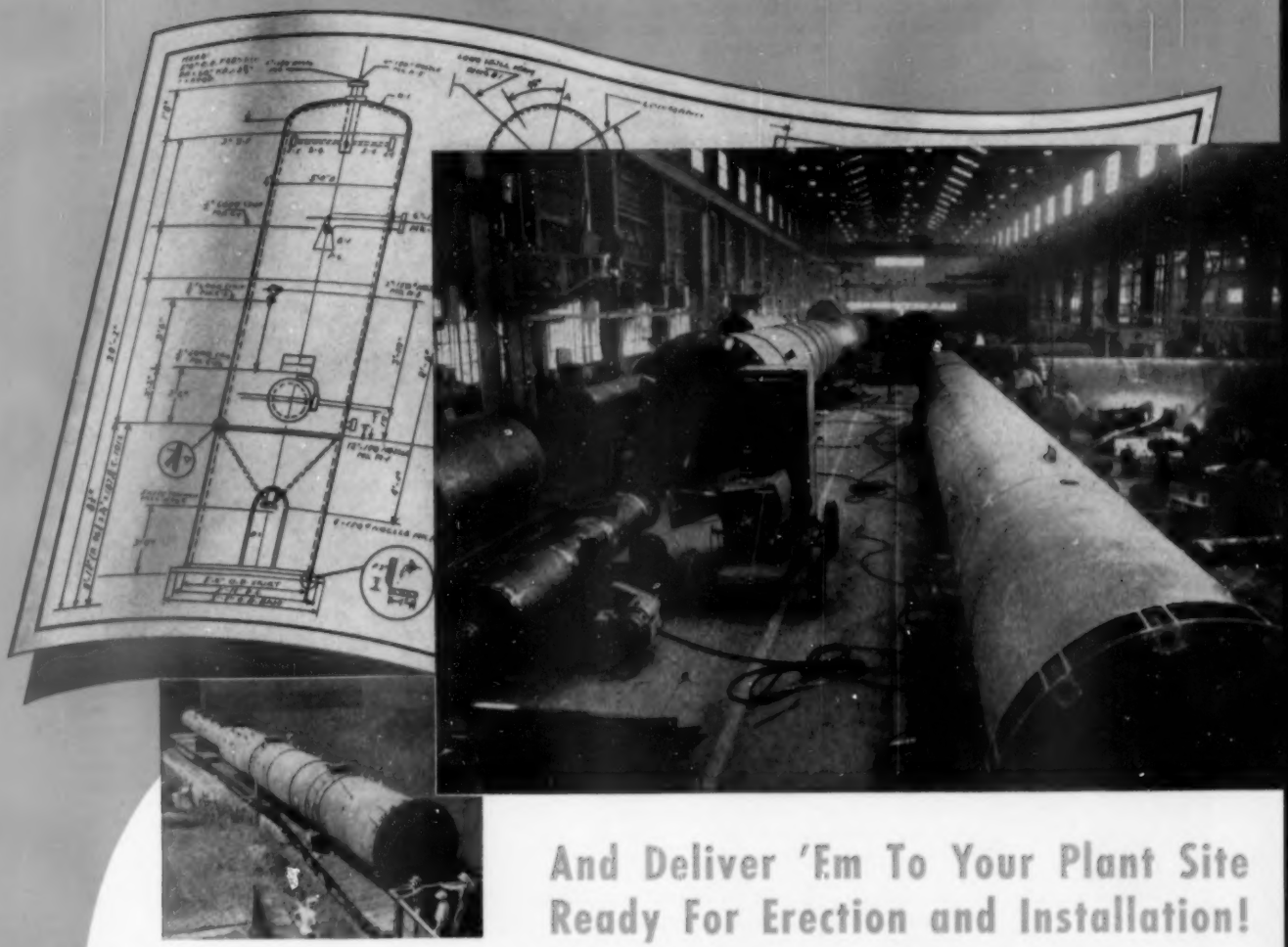

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E. S. Newlon heirs, wildcat resulted in a good gas well testing 1,700,000 cu. ft. of gas, Gordon sand 1,266-1,293 ft., gas 1,270-1,284 ft., Fifth sand 1,466 ft., gas 1,491-1,496 ft., TD 1,498 ft. Bobray Exploration Co. 2 Chester C. Housh, is drilling at 887 ft., and P. C. McKenzie Co. 1 Elk Hohn Coal Corp., at 5,794 ft.

OHIO

Beldon Oil and Gas Co. moved across the county line and brought in the first Clinton sand oiler in Rose Township, Carroll County. On 1 W. E. Grell, Section 35, pay sand was logged at 4,926-4,929 ft., and made 80 bbl. in a 24-hour test after fracturing.

A third test, after two dry ones, proved productive on Carl Sheppard, Section 14, Jackson Township, Muskingum County. R. H. Helmick et al found a showing in the second Clinton at 3,184-3,200 ft., with an initial after fracturing of 130 bbl. in 24 hours.

Norwood Johnson et al are making good progress on their deep test on S. J. Burkhard, in Section 10, Enoch Township, Noble County. The Clinton horizon will probably be penetrated if the Oriskany sand is found to be unproductive.

INDIANA

C. E. O'Neal & Co.-Pacific Operating-Guthrie May 1 Bertram, SE SE SW 36-3s-11w, 15 miles north of Evansville in Gibson County, is swabbing and flowing 10 bbl. oil per hour natural from the O'Hara lime at 1,992-96 ft.

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MONTANA

Glacier County Wildcat Flows Oil

Union Oil Co. of California and Carter Oil Co. have tested a discovery in northern Glacier County. Recovery of oil from lower Mississippian was from the joint wildcat, 1 Tribal-544, C NW NW 19-37n-8w, in the Landslide Butte area. The well is about 7 miles south of Del Bonito field in Canada and some 8 miles west of Reagen field.

Test was of the interval 5,754-5,801 ft. There was gas at the surface at the rate of 384,000 cu. ft. per day after 10 minutes, with the blow decreasing throughout the test. Oil flowed after 58 minutes, and when pipe was pulled recovery was 2,000 ft. of 41°-gravity oil. Flowing pressure was 400-500 psi., and shut-in pressure 1,700 psi. The tested formation was limestone (lower Madison) with a few vertical fractures. The operators were reported coring below 5,801 ft. and will test Devonian before attempting completion in the Madison.

The discovery is about 18 miles northwest of Cut Bank field, and northwest of the Sweetgrass arch. It is slightly east of the principal area of the disturbed belt along the mountain front running north and south through the state.

There has been an increasing amount of interest in this portion of Montana during recent months. In the past year the majority of new land leasing done in Montana has been in this sector of the state. Very little drilling to depths below the upper Madison which produces in various north central Montana fields has been done. The current wildcat is in support of theory long held, but hardly tested by northern Montana operators that deeper penetration of Mississippian formations in this area would pay off.

Recent sales of Indian lands through the Blackfoot Reservation has demonstrated the amount of interest in the area. Lands have brought high bonuses and bidding has been done by a large number of firms and individuals.

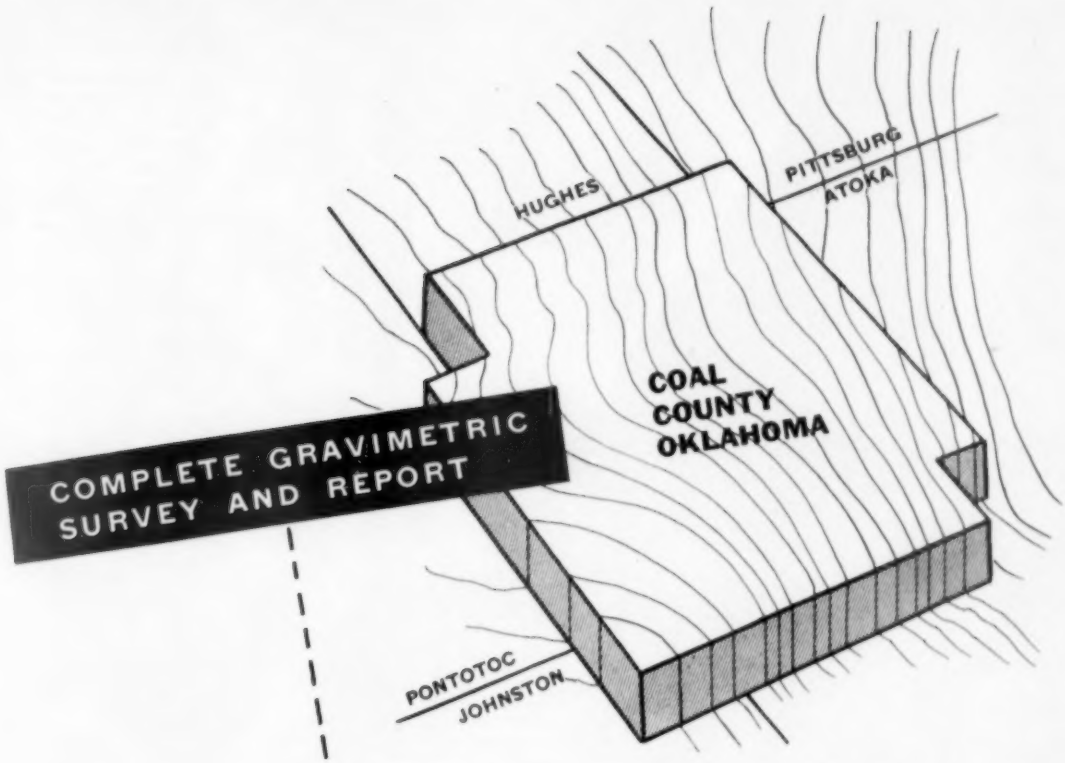
Pondera Area Discovery Completed

Western Oils, Inc., has completed a small Madison discovery aa 1 Bills, SW SE SW 31-28n-6w, west of Pondera field, Pondera County, Montana. The well produced from the zone 3,330-33 ft., with top of Madison called at 3,308 ft. The new producer is 7 miles west of Pondera field production.

Brorson New Pay Discovery on Pump

Sun Oil Co. and Phillips Petroleum Co. recovered 188 bbl. of oil per day on pump at 2 Dynneson, C SW SW 29-24n-58e, in the Brorson area, Richland County. The well is a new pay discovery in this area, with production from Madison at 9,128-9,220 ft. The Brorson discovery produced from Ordovician, and the second well was intended as a confirmation to this horizon. Shows found in Madison, however, warranted extended testing, which proved commercial.

About 2 bbl. of water were recovered with the oil during a 24-hour pump test. The discovery is regarded as of major significance to the eastern Montana area, where produc-



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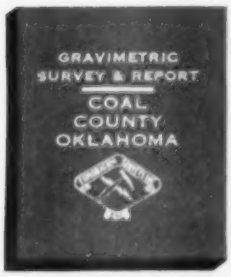

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tion east of the Cedar Creek anticline has previously been from deeper zones.

NEVADA

Eagle Springs Discovery Completed

Shell Oil Co. reported a gage of 410 bbl. of fluid, 9 per cent cut on pump tests of 1 Unit, SE NE NW 35-9n-57e, in the Eagle Springs Unit, Nye County. The net recovery of 373 bbl. of oil made the well definitely a commercial producer. The company has released location for wells at 2 Unit, C NE SE 2-7n-56e, and at 3 Unit, C NE NE 27-8n-57e.

NORTH DAKOTA

East Side Exploration Remains High

Wildcatting in the state toward the east side of the Williston basin continues to contribute a large share of total North Dakota activity. Calvert Exploration Co. has announced location for five wildcats in Stutsman County, Shell Oil Co. has made location for another in its series in Benson County, and an independent group has also staked a location in the same county.

Calvert will drill 1 Ganser, NW SW 12-140n-67w 1 Wanceh, NW NW 12-139n-67w; 1 Wood, SE SW 24-139n-67w; 1 Robertson, NE NE 26-138n-67w; and 1 Rau, SE SW 35-139n-68w. All are on acreage farmed out by Atlantic Refining Co. and Northern Natural Gas Co. of Omaha. They are all scheduled to granite.

Shell Oil abandoned 1 Stenson, NW NE 23-156n-69w, Benson County in Mississippian, with no shows reported. The company is drilling below 1,600 ft. at 1 Jorgenson, NE SW 5-156n-68w.

Also in Benson County, National Bulk Carriers, Inc., and Smith & Summers, Bismarck consultants have made location for 1 Stadum, NW SE 31-154n-70w. It is on a farmout from The California Co.

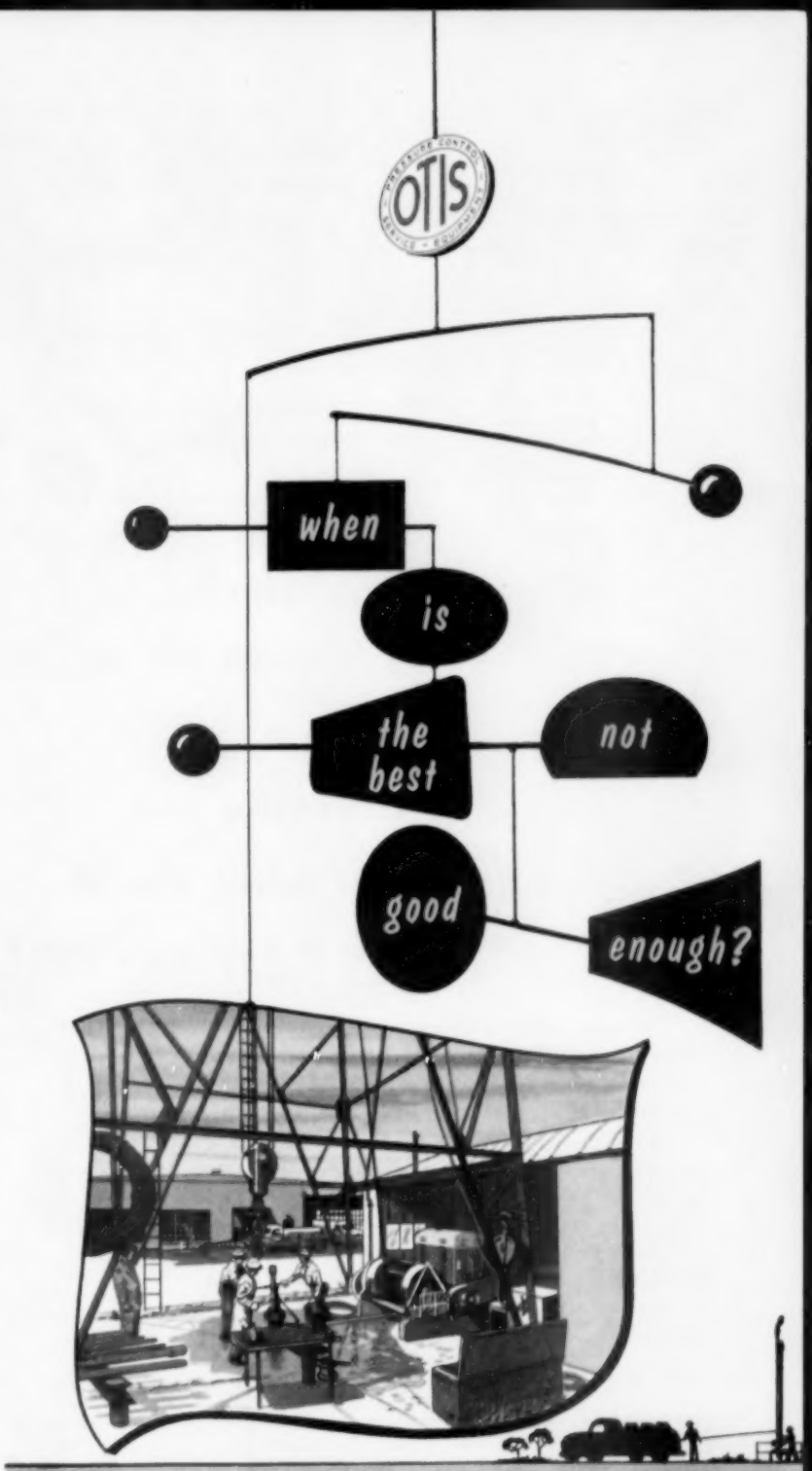
Summer Short Courses

Three limited-enrollment high-level courses for practicing mining and petroleum geologists are being planned for the Cody-Red Lodge area during the periods July 19-21, July 22-23, and July 26-28, 1954. The participation in each 1954 course will be limited to about 40 persons in order to make possible effective presentation and discussion. The courses are being offered by the North Dakota Agricultural College at Fargo. The first two courses are primarily planned for men of advanced professional experience and the last one primarily for younger men who are just entering upon field work in the Rocky Mountain-Northern Great Plains region.

WYOMING

Maverick Springs Wildcat Tests Curtis Gas Shows

Cities Service Oil Co. recovered small amounts of gas on test of Curtis sand at shallow depth at 1 Tribal, NE NE NW 36-6n-2w(WRM) in the Southeast Maverick Springs area of Fremont County. The operator tested 344-359 ft., with recovery of gas at the rate of 10,000 cu. ft. per day. The operator is drilling below 400 ft. and will test Tensleep at about 1,600 ft. The well is 2 miles southeast of Maverick Springs



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COLORADO

Logan County Rank Wildcat Flows 12 BOPH

Shell Oil Co. reported recovery of oil at the rate of 12 bbl. per hour on test of D sand at 1 State A, E½ NW SE 32-7n-52w, Logan County. The perforated zone is 4,457-75 ft. Flowing pressure was 420-890 psi. The well attracted attention several days ago with drill-stem recovery which was apparently commercial. It is important as the first oil production south of the course of the South Platte River through Logan County. The operator is continuing to test. J sand was found nonproductive.

WESTERN NEBRASKA

West Sidney Area Wildcat Recovers Oil

Harper-Turner Oil Co. and Dunn & Boreing reported a flow of oil after 1 hour of drill-stem test of 1 Dimick, NW NW NW 21-13n-50w, Cheyenne County. Test was of J sand at 4,985-94 ft. Flowing pressure was 300-900 psi. The well is ½ mile north of D sand oil production at Fleming field, and is on the southeast flank of the West Sidney gas area.

Banner County Wildcat Shows Reported

Another discovery in the active Harrisburg area of Banner County is indicated at Harry Royster's 1 Downer, C NE NE 11-18n-56w, according to reports by the operator. The well is half mile south of the town of Harrisburg. The operator is running casing and will test J sand. Cores 6,032-72 ft. had 17 ft. of apparently productive sand. Drill-stem tests were not reported run.

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CALIFORNIA

Small Oil Find for Devils Den Area

Kenmac Oil Co. completed an exploratory test about 2½ miles southeast of Devils Den production as a small oil producer. The wildcat, 27x-20 Bates estate in NW SW 20-25s-19e, Kern County, topped the oil pay at 1,470 ft. and was bottomed at 1,560 ft. It was completed pumping about 50 bbl. of 26°-gravity crude daily. It was a northern outpost to six abandoned shallow tests and one 9,200-ft. dry hole drilled in SW Section 20.

In the Alfertiz Anticline area 5 miles northwest, Gilliland Oil Co. et al. 1 West was flowing and pumping about 140 bbl. of 25°-gravity crude through 19/64-in. choke. Production was through perforations at 1,475-1,710 ft., in two sands of Eocene age. It was the fourth producer for the operator since the pool's discovery in late April. West 2 was being started as a western offset to 1 West.

Tejon Ranch Area Has Three Deep Tests

Union Oil Co. was preparing to start 11-24 Reserve-Hay in 23-11n-19w to give Tejon Ranch area of southern San Joaquin Valley its third deep test. The two already under way were General Petroleum Corp. 16-3, S.P.-Tejon in Section 3, and Richfield Oil Corp. F-1 San Emidio in 1-10n-20w.

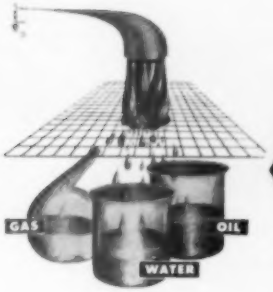
The latter is about 4 miles southwest of the new Olcese discovery recorded by Reserve Oil & Gas Co. 42 Reserve-Pauley in NE NW 34-11n-19w. There Reserve was in process of completing 32 Reserve-Pauley in the 5,624-5,728-ft. sand. Southeast of the discovery, which is thought to be on a faulted anticlinal nose, Richfield Oil Corp. was nearing the pay at 53 Tejon-B.

Beach Pool in Prospect

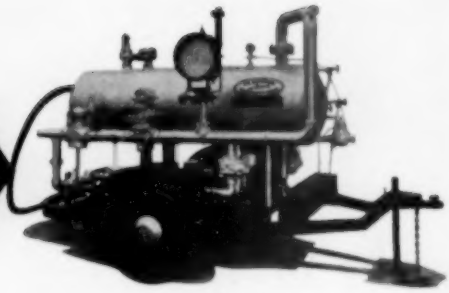
A new coastal field discovery about 1 mile northwest of Huntington Beach was in prospect based on formation tests. The Sunset Beach wildcat, Burt Aston 1 Lomita, showed a 2,800-ft. fluid rise after the tester had been open 2 hours at the interval 7,052-7,100 ft. Of the fluid recovered, 2,000 ft. was 29°-gravity crude. Following the test the operator ran 7-in. casing to 7,185 ft., redrilled total depth. Location of the test is in SE NE 19-5s-11w.

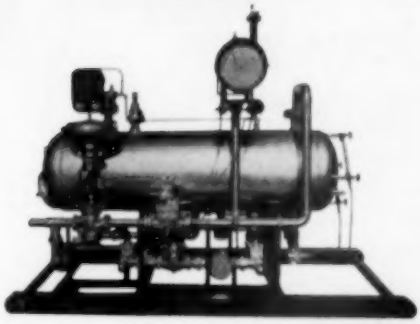
Offshore Seal Beach Test

Monterey Oil Co. was drilling ahead at its island-based wildcat 1½ miles offshore from Seal Beach. At last report the test, a "no dope" hole other than depth, had reached 5,680 ft. Labeled 3 Monterey-Texas-State, it is expected to reach basement somewhere between 7,000 and 9,000 ft. Following completion of this vertical test, two slant-hole wells will be drilled from the 75-ft. diameter island.



Get the Facts





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A-545- **EXPORT SALES** — MID-CONTINENT SUPPLY COMPANY, 42 Broadway, New York City. Cable — MIDUNITRIG

MISSISSIPPI

Paluxy Oil Production Indicated in Soso Field

Indications of oil production in the Paluxy zone of the Lower Cretaceous horizon have been given in two more deep tests in Soso field, in Jones, Jasper, and Smith counties.

Union Producing Co., in a 10-minute drill-stem test at 9,565-85 ft. in Paluxy sand at its 1 Bush, in 27-10n-13w, Jasper County, recovered 940 ft. of 20°-gravity oil with water cushion and 60 ft. of salt water.

One mile to the west, in Smith County, the same operator, at its 2-A Ruffin Unit, 29-10n-13w, got 2,600 ft. of 21°-gravity oil and 90 ft. of oil-cut mud in a 10-minute test of the zone 9,706-29 ft.

Both holes are being deepened.

Present production at Soso, one of the larger southern Mississippi fields, is gas and condensate from Upper Cretaceous-Eutaw sands at 6,500 to 6,700 ft., and oil from the Lower Cretaceous-Rodessa zone around 12,000 ft. Wells drilled to the Rodessa zone have encountered showings, mostly gas and condensate, in the Paluxy but so far no attempts have been made to complete in it.

New Wilcox Discovery Indicated in Jefferson

Calto Oil Co. and associates have an indicated new Wilcox oil-discovery well in southwestern Jefferson County, where their 1 Walser in 25-8n-1w, is reported flowing at the rate of more than 140 bbl. of oil pay in tests through 10/64-in. Pressure gaged 300 psi.

Pay is in the Artman zone with perforations at 5,586-87 ft. Perforations are in the top foot of 3½ ft. of net effective oil sand logged.

WILDCAT COMPLETIONS

SOUTHWEST TEXAS
District 1

Atascosa County: Carter & Carter 1 Brauchle, CCI&M Sur. 64, A-186. IPP 14.04 BOPD, 38°, Navarro sand 4,290-4,317 ft. (open hole). TD 4,317 ft. (New field.)

Sid Katz 1 McCown, R. Meade Sur. 1225, A-576. Dry. TD 4,535 ft.

Selby-Walker Corp. and McFarland Drilling Co. 1 Palmer, A. L. Bacon Sur. 1138, A-75. IPP 8 BOPD, 35.2°, open hole 2,870-78 ft. TD 4,446 ft. (New field.)

Texita Oil Co. et al 1 Vrana, J. C. Hidet Sur., A-367. Temporarily abandoned. TD 5,020 ft.

R. B. Wheery and C. A. Green 1 Vrana, Section 1501, J. C. Hidet Sur., A-357. Dry. TD 4,724 ft.

Bexar County: Harroun & Harroun 1 Jackel, Lot 38, Sur. 55. IPP 3 BOPD, 22°, open hole 1,090-1,150 ft. TD 1,150 ft. (Extends Gas Ridge area.)

Caldwell County: Hanson Oil Co. 1 Pierce estate, Solomon Seal Sur. Dry. TD 2,350 ft.

Rock Hill Oil Co. et al 3 Holloway & Mannella, B. Hardeman Sur., A-120. Dry. TD 412 ft.

Frio County: Pronto Drilling Co. and Holland Oil Co. 1 Lenior, AB&M Sur. 5, A-29. Dry. TD 4,376 ft.

Guadalupe County: M. L. Wise et al 1 Weinert, G. W. Martin Sur. 223. Dry. TD 900 ft.

Kinney County: Austral Oil Exploration Co.

This efficient blowout preventer control manifold uses 1" WECO Fig. 602 Unions and Chiksan 1" style 50 High Pressure Swivel Joints.

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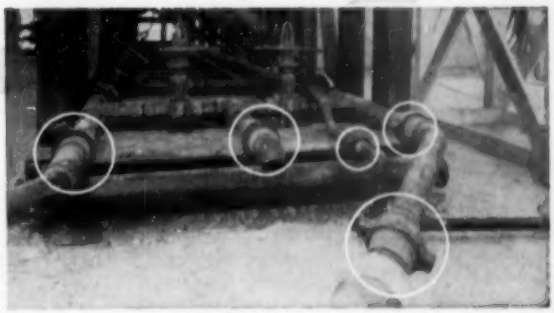
PAY OFF in Service and Dependability



WECO Fig. 602 Unions on the rig's mud line.

WECO Unions pay their way many times over in longer life, trouble-free service and leak-proof sealing. The time and work saved in rigging-up and tearing-down mean more savings for you.

The WECO Fig. 602 Union is an outstanding example. Strong, tough and compact, it withstands the severe conditions and high pressures of present day deep drilling. Its steel-to-steel Ball and Cone Seat is protected by a replaceable, resilient seal ring.

These photos show some of the WECO Fig. 602 Unions used exclusively on a 10,000-ft. rig recently shipped to a foreign country.

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WELL EQUIPMENT MFG. CORP. • Division of Chiksan Company • HOUSTON 1, TEXAS

WILDCAT COMPLETIONS

1 Wardlow, Meliton Valez Grant Dry. TD 3,500 ft.

McMullen County: Argo Oil Corp. 4-P Edrington estate, AB&M Sur. 57. Dry. TD 2,550 ft.

Bridwell Oil Co. 6 Brownson, John Fadden Sur., A-3. Dry. TD 954 ft.

Henderson Coquat 1 Fehler estate, G. Pittuck Sur., A-10. Dry. TD 993 ft.

Production Corp. of Nevada 1 Horton, J. M. Jean Sur., A-281. Dry. TD 6,812 ft.

T. S. Schibienski 1 Lowe Ranch, AB&M Sur. 38, A-1750. IP 4,000 M.c.f. daily, open-flow potential, perforated 10,165-75 ft. TD 10,333 ft. (New pay in, and extends Hostetter field.)

Travis County: M. J. Simmons 1 Johnson, Pedro Rodrigues Sur. 66. Dry. TD 1,320 ft.

J. H. Williams 1 Ohlendorf, Sara Gainer Sur. Dry. TD 1,350 ft.

Wilson County: Morris Cannan and R. D. Mebane 1-A Ploch, Claiborne Rector Sur. 134. Dry. TD 3,092 ft.

Sutton Drilling Co. 1 Popham, J. Martinez Sur., A-213. Dry. TD 5,619 ft.

District 4

Duval County: Robert H. Blair and John B. Vreeland 1 Bennett, E. H. Caldwell Sur. 442, A-982. Dry. TD 4,104 ft.

Jim Hogg County: Edwin Singer, trustee, 1 Hellen, BS&F Sur. 49, A-38. IPP 9.6 BOPD, 22°, perforations 2,962-65 ft. TD 2,969 ft. (New field.)

Jim Wells County: R. S. Hays and Charles A. Daubert 1 Muil, G. W. Main Sur. 30, A-283. Dry. TD 3,200 ft.

Kelsey & Spiller 1 Jackson, Blk. 6, Eureka College Subd. 1 IP 9,000 M.c.f. daily, open-flow potential, gas-condensate ratio 33,300 cu. ft. per barrel, 64.4°, perforations 5,686-96 ft. TD 7,158 ft. (New field—West La Gloria.)

Nueces County: Edwin L. Cox 1 Davis, Sec. 63, George H. Paul Subd., Driscoll Ranch. IP 84 BOPD net, ⅛-in., 34°, perforations 5,775-79 ft. TD 5,962 ft. (New field.)

San Patricio County: Phillips Petroleum Co. 3 Key, John Smith Sur., A-234. IP 70.06 BOPD, 9/64-in., 22.1°, perforations 4,006-10 ft. TD 6,616 ft. (New field—Nueces River.)

Starr County: Bass & Vessels 1 Zarsky, Tract 43, Porcion 82. IP 2,250 M.c.f. daily, open-flow potential, gas-condensate ratio 600 M.c.f. per barrel, 53.2°, perforations 1,220-25 ft. TD 1,751 ft. (New field—Gregg Woods.)

Clark Fuel Producing Co. and K. D. Owen 1 Block Realty, Porcion 95. Dry. TD 3,539 ft.

W. H. Wilson 1-A Roos-Bennett, Tract 100, Porcion 93. Dry. TD 5,010 ft.

Webb County: W. L. Cotton 1 Villarreal, Sur. 744. Dry. TD 1,612 ft.

Ben K. Franklin 2 White, Blk. 5, C&M Sur. 612. Dry. TD 2,434½ ft.

TEXAS GULF COAST

District 3

Brazoria County: J. M. Flaitz and R. B. Mitchell 1 Scheffler unit, F. Moore Sur., A-100 (North Rowan area). Dry. TD 11,519 ft.

Texas Eastern Production Corp. 1 North Rowan Unit 3, F. Moore Sur., A-100. IP 204.17 BCPD with 1,147 M.c.f. daily, adjustable choke, perforations 10,263-73 ft. (Frio). TD 11,501 ft. (New pay in North Rowan field.)

Colorado County: Charles H. Osmond, Hill & Hill, and A. W. Cherry 1 Lehrer, S. Kennelly Sur., A-30. IP 21,000 M.c.f. daily, open-flow potential, gas-condensate ratio 36,900 cu. ft. per barrel, 49.8°, Wilcox 9,685-9,705 ft. (perforations). TD 9,708 ft. (New field.)

Fort Bend County: Union Producing Co. 1 Cinco Ranch, T. Hobermaker Sur., A-190. Dry. TD 8,040 ft.

Liberty County: General Crude Oil Co. 4 Morris et al., Peter Mason Sur., A-69. IP 7,650 M.c.f. daily, perforations 11,853-63 ft. TD 12,483 ft. (New pay in Raywood area.)

John W. Mecom 1 Grayburg, HT&B Sur., A-280. Dry. TD 9,310 ft.

Matagorda County: Gulf Oil Corp. 1 Rugeley et al., Thomas Fowler Sur., A-156 (Shepherd's Mott area). Dry. TD 13,828 ft.

Trull & Thompson 1 Ryman, E. R. Wrightsman Sur., A-101. Dry. TD 6,347 ft.

Orange County: The Texas Co. 18-B Polk, Jacob Beaumont Sur., A-432, (Port Neches area). Dry. TD 6,713 ft.

San Jacinto County: Starco Oil Co. 1 Cannon, W. R. Goode Sur., A-136 (North Mercy area). Dry. TD 8,625 ft.

Wharton County: Ada Oil Co. 1 Northington, Alex Edgar Sur., A-93. Dry. TD 7,500 ft.

J. B. Ferguson and Peter Petkas 1 Malek I&GN Sur. 14, A-235. Dry. TD 3,365 ft.

EAST TEXAS

Cherokee County: Delta Drilling Co. 1 Sanders, Jose Pineda Sur., A-40. Dry. TD 5,580 ft.

D. D. Feldman Oil & Gas Co. 1 Johnson,

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WILDCAT COMPLETIONS

C. Schneider Sur., A-813. Dry. TD 5,000 ft.

Collins County: Humble Oil & Refining Co. 1 Miller, Leonard Searcy Sur., A-828, 3½ mi. W. McKinney. Dry. TD 11,407 ft. Woodbine 570 ft., Travis Peak 2,562 ft.

Freestone County: Byrd Oil Corp. and R. E. Smith 1 Vickers, W. Carter Sur., A-164. Dry. TD 7,517 ft.

Hill County: Jesse Hickey Oil Corp. 1 Holasek, Jonathan Sherwood Sur. Dry. TD 3,000 ft.

Hunt County: Inca Drilling Co. 1 Carl Davis, John L. Davis Sur., A-232. Dry. TD 2,000 ft. Woodbine 1,594 ft.

Rusk County: Skelly Oil Co. 1 Weatherby, W. M. McIlvane Sur., A-528. Dry. TD 9,015 ft.

Van Zandt County: Donald Bolls, F. R. Jackson and A. R. Graves 1 Pittman, E. J. McKnight Sur., A-881. Dry. TD 4,489 ft.

Wood County: Ace Oil Co. 1 Bryan, Elijah Allen Sur., A-8. Dry. TD 5,000 ft.

E. R. Jackson 1 Roberts, Benjamin Hearn Sur., A-309. Dry. TD 5,942 ft.

TEXAS PANHANDLE

Deafsmith County: Gardner Bros. 1 Collett, CSS, Sec. 10-3n-1e. Dry. TD 6,639 ft.

Hansford County: The Texas Co. 1 Butler, Blk. 2, Sec. 5, WCRR. Dry. TD 7,973 ft.

Hemphill County: Gulf Oil Corp. 1 Wilson, A-2, Sec. 41, H&GN. Dry. TD 4,140 ft. Geol. wildcat.

WEST CENTRAL TEXAS

Brown County: Jess Hickey Oil Corp. 1 Bell, H. Batton Sur. Dry. TD. 1,724 ft.

Callahan County: Basil Coe 1 Johnson, Blk. 79, Comal CSL Sur. 181. IP 65 BOPD, 15/64-in., 44°, TP 25 psi., GOR 275 cu. ft., Cross Plains sand 1,534 ft., TD 1,582 ft.

Rhodes Drilling Co. 1-A Dyers, Sec. 57, BBB&C Sur. IP 218 BOPD, 15/64-in., 42°, TP 700 psi., GOR 1,247 cu. ft., Gardner sand 3,858-62 ft. TD 3,862 ft.

S & S Drilling Service, Inc., 1 Odom, G. W. Denton Sur. 345. Dry. TD 1,685 ft.

Coleman County: Brown Drilling Co. 1 Windham, 105-1-GH&H. Dry. TD 3,657 ft.

L. Ball Burbee 1 Yarbrough, Caldwell CSL Sur. 287. Dry. TD 1,336 ft.

Reigle & Henderson 1 Santa Anna Independent School District, Blk. 109, Wade H. Bynum Sur. 272. Dry. TD 1,882 ft.

Jones County: American Trading & Production Co. 1 Swenson, 25-1-BBB&C. Dry. TD 5,007 ft.

The Texas Co. 1 Rogers, Lot 27, DeWitt CSL Sur. 149. Dry. TD 4,800 ft.

Mills County: Lorenna Ball Busbee 1 Rasco, James Elkins Sur. Dry. TD 1,450 ft.

Nolan County: Joe A. Humphrey 1 Withers, 78-21-T&P. Dry. TD 7,133 ft. Caddo 6,235 ft., Cambrian 7,025 ft.

Lowry Oil Co. 1 Adrian, 45-20-T&P. Dry. TD 6,905 ft.

A. A. Cameron 1 Baker, 49-23-T&P. IPP 121 BOPD, 40°, GOR 738 cu. ft., Strawn reef perforated 6,326-66 ft. TD 6,395 ft.

Palo Pinto County: A. W. Komarek 1 Stuart, 79-3-T&P. Dry. TD 1,600 ft.

Taylor County: Allison & Prestridge 1 Campbell, L. Hargis Sur. 407. IPP 223 BOPD, 17/64-in., 43°, TP 155 psi., GOR 4,696 cu. ft., perforated Gray sand 4,196-99 ft. TD 4,535 ft.

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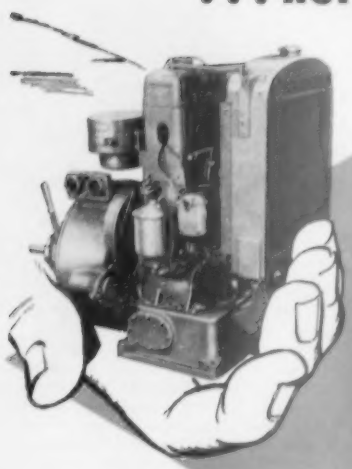

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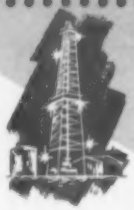

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WILDCAT COMPLETIONS

NORTH TEXAS

Archer County: Tom L. Enright 1 Garvey, TE&L Sur. 1802. Dry. TD 777 ft.

Bill Lisle 1 Meade, Blk 41, L. M. Meade Pasture Subd. Dry. TD 1,500 ft.

S. W. Petre 1 Colgan, SPRR Sur. 2, A-1253. Dry. TD 1,492 ft.

Harry F. Snebold 1 Wilson, 10-3-H&TC. Dry. TD 1,744 ft.

Baylor County: Oakland Corp. 1 Cockrell, 74-A-BB&C. Dry. TD 1,708 ft.

Clay County: L. T. Burns 1 Hatcher, Blk. 22, Webb Subd., San Augustine University Sur. Dry. TD 4,660 ft.

M. J. Frances 1-A Lyon, Blk. 17, Byers Bros. Subd. Dry. TD 1,810 ft.

Elmer Frerck 2 Sowden, MEP&P Sur., A-350. Dry. TD 1,840 ft.

Warren Petroleum Corp. 1 Jackson, T. F. Johnson Sur., A-726. Dry. TD 4,304 ft.

Denton County: Christie, Mitchell & Mitchell 1 Knox, T. H. W. Forsyth Sur., A-433. Dry. TD 6,367 ft.

W. B. Omohundro 1 Varley, H. G. Stewart Sur., A-1076. Dry. TD 5,339 ft.

Jack County: Taubert & Harper 1-A Loving, TE&L Sur. 2747. Dry. TD 4,606 ft.

Knox County: R. W. McDonnell 1 Westerman, Sec. 215, Blk. A, BBB&C Sur. Dry. TD 1,860 ft.

Montague County: Arnold H. Bruner 1 Benton, Abel A. Lewis Sur., A-420. Dry. TD 5,833 ft.

Arnold H. Bruner 1 Yeater, 28-4-H&TC. Dry. TD 5,858 ft.

Wilbarger County: Robert Karotkin 1 Waggoner, 36-14-H&TC. Dry. TD 2,412 ft.

Konrad Sitzgold 1 Waggoner, 35-3-H&TC. Dry. TD 2,502 ft.

Wise County: Tom M. Medders 1 Boykin, H. M. Cassidy Sur., A-178. Dry. TD 4,710 ft.

Young County: L. T. Burns 1 Emma Ward, TE&L Sur. 2284, A-1081. IP 41 BOPD, 6/64-in., 41°, GOR 480 cu. ft., TP 75 psi., Caddo perforations 4,014-19 ft. TD 4,083 ft.

Woodson Oil Co. 1 Gahagan, TE&L Sur. 2177. Dry. TD 4,274 ft.

WEST TEXAS

Borden County: Texas Crude Oil Co. 1-44 Brown, 44-33-T4N-T&P. IP 271 BOPD, ½-in., 38°, TP 200 psi., GOR 706 cu. ft., Spraberry pay 7,466 ft. TD 8,923 ft

Union Oil Co. of California 1 Porter, 17-32-T3N-T&P. Dry. TD 8,280 ft. Elev. 2,523 ft., Spraberry 5,995 ft.

Coke County: Midwest Oil Corp. 1 Simpson, 423-1A-H&TC. Dry. TD 6,411 ft.

Concho County: Ellett & Sartain 1 Judge, 7-9-H&TC. Dry. TD 4,303 ft.

Crockett County: Cities Service Oil Co. 1-D Shannon, 20-Q-ELRR, 15 mi. SW Big Lake. IP 1,660 BOPD, ¾-in., 44°, TP 250 psi., GOR 2,215 cu. ft., Strawn 8,139-87 ft. TD 8,205 ft.

Garza County: Alamo Corp 1 Whitten, Sec. 2, SF 1440, AB&M Sur. Dry. TD 3,593 ft.

Glasscock County: Strawn Drilling Co. 1 Keyser, 56-30-W&NW. Dry. TD 1,761 ft.

Howard County: Eugene Anderson 1 Petty, 7-33-T1N-T&P. Dry. TD 3,145 ft.

Lubbock County: Western Drilling Co. 1 Perser, 14-D5-EL&RR. Dry. TD 6,520 ft.

Pecos County: Tiger Minerals, Inc., 1 White & Baker, 11-Z-TCRR. Dry. TD 1,715 ft.

Reeves County: Hill & Meeker 1 Settle, 38-55-T4-T&P. Dry. TD 4,062 ft.

Schleicher County: L. E. Schreck 1 Wilson, 9-V14-W. H. Mauldin Sur. Dry. TD 7,155 ft.

Sutton County: Hunt Oil Co. 1-8 Hardgrove, 8-A1402-J. A. Robbins Sur. Dry. TD

WILDCAT COMPLETIONS

7,025 ft. Elev. 2,276 ft., Ellenburger 6,480 ft.

Sinclair Oil & Gas Co. 1 Davis, Sec. 16, EL&RR Sur. IP 3,000 M.f.g., Canyon sand 5,565-5,665, 5,720-70 ft. TD 5,800 ft. FP 300 psi.

Sinclair 1 Thomason heirs, 63-A-HE&WT. IP 4,100 M.f.g., Canyon sand 5,390-5,420, 5,460-5,535 ft. TD 5,700 ft.

Sunray Oil oCrp. 1 Hunt,71-14-TW&NG. Dry. TD 5,300 ft.

Western Drilling Co. 1 Wallace, 68-14-TW&NG. Dry. TD 5,112 ft.

Tom Green County: Caroline Hunt Trust 1 Jacobs, Sec. 953, John Ennert Sur., 2 mi. SW Christoval. IP 335 BOPD, ¼-in., 41°, TP 645 psi., GOR 1,286 cu. ft., Strawn perforations 5,650-62 ft. TD 6,550 ft.

ILLINOIS

Bond County: Magnolia Petroleum Co. 1 Utlant, NE SW SE 21-4n-3w. Dry. TD 1,143 ft.

Christian County: Collins Bros. 1 Gordon, SW NE NW 21-14n-1e. Dry. TD 3,033 ft.

Keystone Oil Co. 1 Garvey, NE SW SW 11-14n-3w. Dry. TD 1,894 ft.

Clinton County: T. M. Pruett 1 White, SW SE NW 16-1n-1w. Dry. TD 1,454 ft.

Edgar County: Robert Mounts 1 Conley, NW SW SW 29-14n-13w. Dry. TD 377 ft.

Gallatin County: Thos. Doran 1 James, SW SW SW 29-8s-8e. Dry. TD 3,035 ft.

Jefferson County: W. H. Tatro 1 Wegman, NE SW NW 18-2s-2e. Dry. TD 2,324 ft.

Macon County: A. J. Slagter 1 Snyder, NE SW NE 18-14n-2e. Dry. TD 2,490 ft.

Perry County: W. H. Barwell 1 Fee, NE NW NE 29-5s-4w. Dry. TD 2,609 ft.

Washington County: Shulman Bros. 1 Mazanaler, NW NE SW 5-3s-4w. Dry. TD 2,439 ft.

Wayne County: Nash Redwine 1 Leach, SW NE SW 32-1n-7e. Dry. TD 3,323 ft.

INDIANA

Daviess County: H. R. Burton 1 Stellars, SE SE SE 1-2n-6w. Dry. TD 1,366 ft.

Dubois County: H. E. Meister 1 Salb, NE NW SE 14-1s-5w. Dry. TD 627 ft.

Posey County: Calvert Drilling Co. 1 Kemberling-Greathouse, NE NE NE 31-4s-13w. Dry. TD 2,010 ft.

KENTUCKY

McLean County: Basin Drilling Co. 1 Sutton, SE NE SE 22-M-26. Dry. TD 3,038 ft.

Union County: Walter Duncan 1 Alvey, NE SE NE 21-P-18. IPP 50 BOPD, Aux Vases 2,826-31 ft. TD 3,030 ft.

Vandenbark-McGuire 1 Logsdon, SE NW NW 6-O-18. Dry. TD 2,750 ft.

MICHIGAN

Allegan County: Norman L. Stevens 1 Martin, NE NW NE 5-3n-13w. Dry. TD 1,642 ft. in Traverse lime.

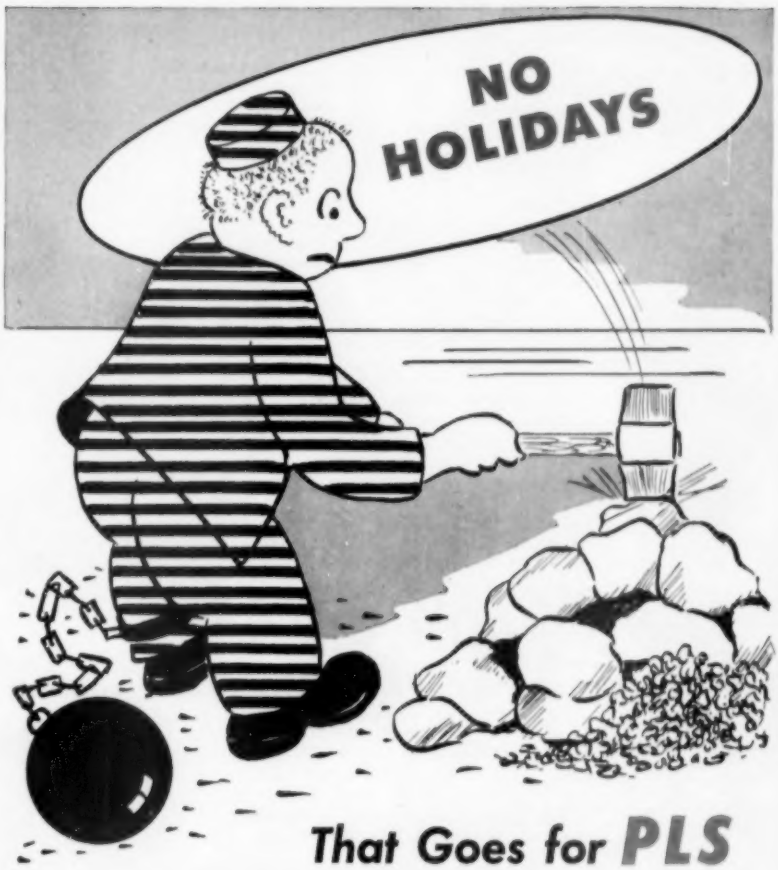
John D. S. Hanson 1-A Berens, NE NW SW 20-4n-13w. Dry. TD 1,701 ft. in Traverse lime.

Kalamazoo County: Ford Oil Co. 1 Greenhoe, SE NE SE 35-3s-12w. Dry. TD 1,260 ft. in Traverse lime.

Ottawa County: P. K. Degenther 1 Collar, SE SE SW 17-8n-13w. Dry. TD 2,013 ft. in Traverse lime.

Dale M. Leonard 1 Gras & Bos Comm., SE NE SW 21-5n-14w. Dry. TD 1,578 ft. in Traverse lime.

Mackey Drilling Co. 1 Neymeiyer, NW SW SW 2-7n-13w. Dry. TD 1,922 ft. in Traverse lime.



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Dependable Service Since 1931

WILDCAT COMPLETIONS

Roscommon County: Sun Oil Co. 1 Meldrum Trustees, SW SW NE 28-22n-2w. Dry. TD 5,837 ft. in Sylvania formation.

Wayne County: C. W. Collin 1 Howell-Walker et al., NE NE NW 5-1s-8e. Dry. TD 4,770 ft. in Trenton lime.

PENNSYLVANIA

Clearfield County: James Drilling Co. 1 Hicks, Clearfield Township, Sec. B. Dry. TD 7,372 ft. in Oriskany.

Clinton County: Downs Gas & Oil Co. 1 Downs, Keating Quad., Sec. B, 5,00 ft. west of east line, 3,350 ft. south of north line. Open flow 6,500 M.c.f. of gas per day, Oriskany sand. TD 6,153 ft. (Gas discovery.)

Lycoming County: Fryer & Hanson Drilling Co. 1 Duffy, Morris Quad. Sec. H. Dry. TD 6,567 ft. in Oriskany.

Northumberland County: Angas Corp. 1 Fox, Shamokin Quad., Sec. D, 3,250 ft. west of east line, 18,800 ft. south of north line. Dry. TD 1,820 ft.

Westmoreland County, Unity Township: Peoples Natural Gas Co. 1-4019 A. W. Kintz. Dry. TD 8,554 ft.

WEST VIRGINIA

Randolph County, Middle Fork district: Washington Natural Gas Co. 1 E. S. Newlon heirs, 1,700,000 cu. ft. gas, Gordon sand 1,266-1,293 ft., gas 1,270 and 1,284-1,288 ft., Fifth sand 1,466 ft., gas 1,491-1,496 ft., TD 1,498 ft.

FLORIDA

Hendry County: Commonwealth Oil Co. 3 Red Cattle Co., SE NE NE 25-45s-28e. Dry. TD 11,667 ft. Elev. 40 ft., Lower Cretaceous 6,388 ft., Sunnyland zone 11,425 ft.

ALABAMA

Baldwin County: Stanolind Oil & Gas Co. 2 U. S. Steel, C NW NW 5-4s-3e. Dry. TD 7,950 ft. Elev. 226 ft., Lower Cretaceous 7,833 ft.

Conecuh County: Sunnyland Contracting Co. 1 Mixon, C NW NW 27-9n-11e. Dry. TD 3,755 ft. Elev. 390 ft., Lower Cretaceous 3,293 ft.

MISSISSIPPI

Franklin County: Sunnyland Contracting Co. and Clinch Drilling Co. 1-E U.S.A., 34-5n-1e. Dry. TD 6,854 ft. Elev. 240 ft. Wilcox 4,636 ft., base Baker shale 6,382 ft.

Sunnyland Contracting Co. 1 Whittington et al., 47-5n-1e. Dry. TD 6,954 ft. Elev. 247 ft., Wilcox 4,686 ft., base Baker shale 6,424 ft.

Jones County: Ginther, Warren & Ginther and Tip Ray 1 Fox et al., SE SW 30-7n-12w. Dry. TD 9,012 ft. Elev. 334 ft., lower Tuscaloosa 8,750 ft.

Wayne County: Lyle Cashion Co. et al., 1 Creagh, SW SW SW 21-10n-7w. Dry. TD 5,065 ft. Elev. 188 ft., Eutaw-Stanley zone 4,785 ft.

SOUTH LOUISIANA

Acadia Parish: Southern Minerals Corp. 3 Frey, 24-7s-1w (Eunice area). Dry. TD 4,220 ft.

Assumption Parish: Union Oil Co. of California 2 Williams, 30-15s-14e. IP 5,000 M.c.f. daily with condensate spray, ¼-in., perforations 13,150-80 ft. TD 13,952 ft. (New pay in East Lake Palourde field.)

Iberia Parish: Humble Oil & Refining Co. 1 Rita Provost Minvielle estate, 41-14s-7e. IP 410 BOPD, ⅛-in., 29.5°, Miocene 16,834-44 ft. TD 17,648 ft. (New pay in Weeks Island field.)

Jefferson Davis Parish: H. L. Hunt 1 McKinley, 2-8s-6w. IP 200 BOPD, 8/64-in., perforations 8,921-31 ft. TD 10,452 ft. (New field.)

Terrebonne Parish: Arkansas Fuel Oil Co. 1 LeCompte, 38-17s-18e. IP 6,000 M.c.f. daily with 18 BC per M.M.c.f., ¼-in., perforations 11,466-76 ft. TD 12,085 ft. (New pay in, and extends Bourg field.)

NORTH LOUISIANA

Claiborne Parish: Gulf Refining Co. 1 Gill et al, 10-23n-5w. Dry. TD 5,550 ft.

DeSoto Parish: A. J. Hodges Industries, Inc. 1 Pollock, 9-12n-12w. Dry. TD 5,015 ft.

Webster Parish: A. J. Hodges B-1 Wadley-Gleason, 12-22n-10w. Dry. TD 6,120 ft.

Shell Oil Co. 1 Braley, C NW NW 11-23n-11w. Dry. TD 11,769 ft. Deep test in Springhill field. Smackover 11,085 ft.

ARKANSAS

Lafayette County: Benedum-Trees Oil Co. 2 Caldwell & Lowe, C SE SW 3-20n-26w. Dry. TD 6,747 ft. Extension to Kiblah field.

Ouachita County: Sneed Bros. 4 Smith, C SW NW 30-15s-17w. IPP 28 BOPD, Sara 2,005-19 ft. TD 3,864 ft. (New pay in Pace City field.)

OKLAHOMA

Atoka County: Gulf Oil Corp. 1 Butler, C SW NE 21-3s-10e. IP 28 BOPD, 2,984-3,046 ft., 31.2°. TD 7,249 ft. (Oil discovery.)

Beckham County: Blackwood & Nichols 1 Cartwright, C NW SE 2-10n-24w. Dry. TD 10,800 ft.

Carter County: Sun Oil Co. 1 Shannon, SW

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3"	5	83	350	15	700	
3½"	5	115	255	15	700	

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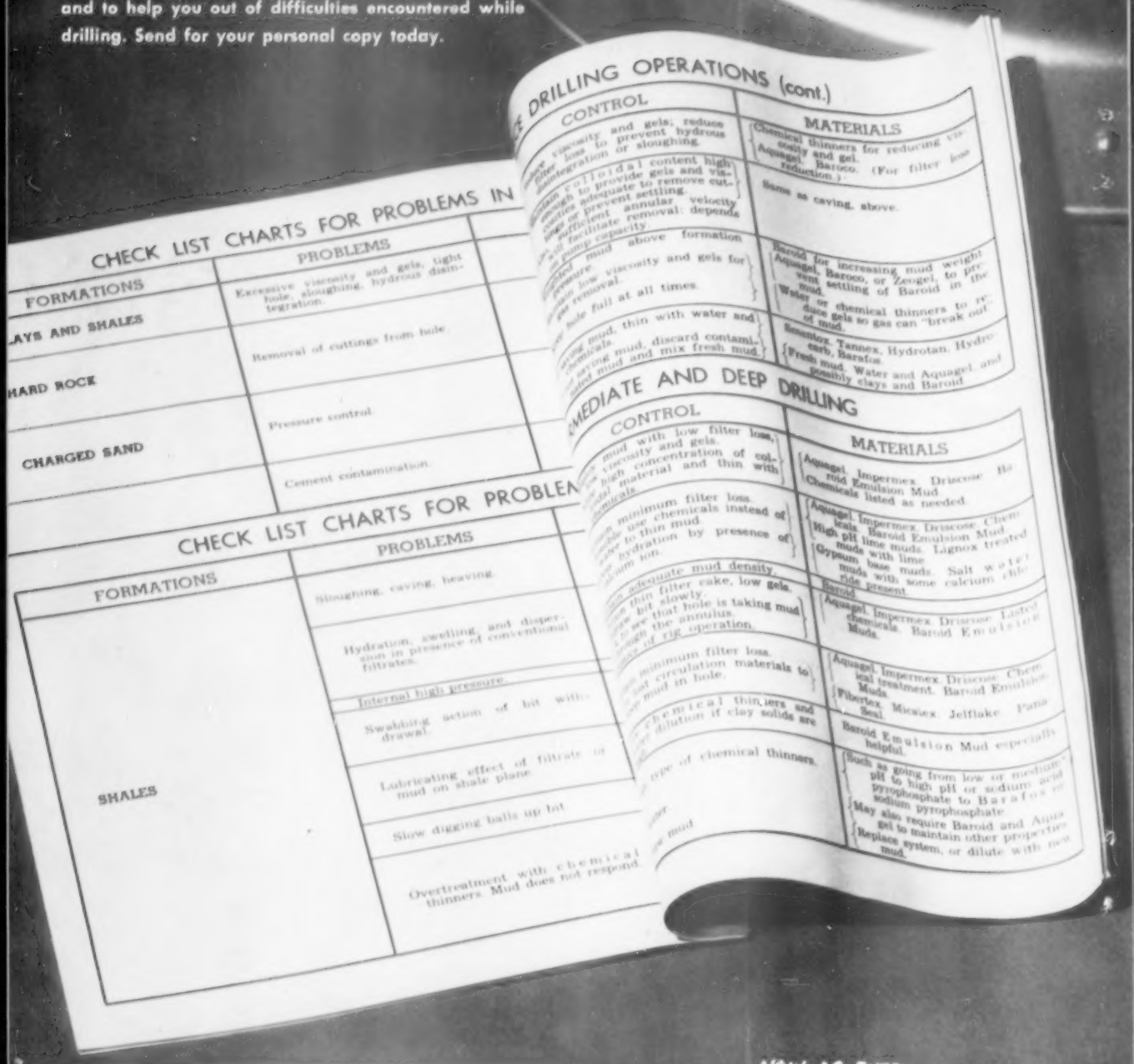

CHECK LIST CHARTS FOR PROBLEMS IN

FORMATIONS	PROBLEMS
AYS AND SHALES	Excessive viscosity and gels, tight hole, sloughing, hydrous disintegration.
HARD ROCK	Removal of cuttings from hole.
CHARGED SAND	Pressure control.
	Cement contamination.

E DRILLING OPERATIONS (cont.)

CONTROL	MATERIALS
viscosity and gels; reduce loss to prevent hydrous disintegration or sloughing.	Chemical thinners for reducing viscosity and gel. Aquagel. Barroco. (For filter loss reduction.)
colloidal content high enough to provide gels and viscosities adequate to remove cuttings or prevent settling. For efficient annular velocity to facilitate removal; depends on pump capacity.	Same as caving, above.
mud above formation pressure. low viscosity and gels for gas removal. hole full at all times.	Baroid for increasing mud weight. Aquagel, Baroco, or Zeogel, to prevent settling of Baroid in the mud. Water or chemical thinners to reduce gels so gas can "break out" of mud.
mud, thin with water and chemicals. mud, discard contaminated mud and mix fresh mud.	Bentonite, Tannex, Hydrotan, Hydrocarb, Barafos. Fresh mud. Water and Aquagel, and gently clays and Baroid.

CHECK LIST CHARTS FOR PROBLEMS

FORMATIONS	PROBLEMS
SHALES	Sloughing, caving, heaving.
	Hydration, swelling and dispersion in presence of conventional filtrates.
	Internal high pressure.
	Swabbing action of bit withdrawal.
	Lubricating effect of filtrate on mud on shale plane.
	Slow digging balls up bit.
	Overtreatment with chemical thinners. Mud does not respond.

EDIATE AND DEEP DRILLING

CONTROL	MATERIALS
mud with low filter loss, viscosity and gels. high concentration of colloidal material and thin with chemicals.	Aquagel, Impermex, Driscose, Baroid Emulsion Mud. Chemicals listed as needed.
minimum filter loss. use chemicals instead of water to thin mud. hydration by presence of calcium ion.	Aquagel, Impermex, Driscose, Chemicals. Baroid Emulsion Mud. High pH lime muds. Lignox treated muds with lime. Gypsum base muds. Salt water muds with some calcium chloride present.
adequate mud density. thin filter cake, low gels. bit slowly. that hole is taking mud. the annulus. of rig operation.	Baroid. Aquagel, Impermex, Driscose, Lignox chemicals. Baroid Emulsion Muds.
minimum filter loss. circulation materials to mud in hole.	Aquagel, Impermex, Driscose, Chemical treatment. Baroid Emulsion Muds. Fibertex, Micatex, Jelflake, Pana Seal.
chemical thinners and dilution if clay solids are	Baroid Emulsion Mud especially helpful.
type of chemical thinners.	Such as going from low or medium pH to high pH or sodium acid pyrophosphate to Barafos or sodium pyrophosphate.
mud	May also require Baroid and Aquagel to maintain other properties. Replace system, or dilute with new mud.

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SW SE 8-3s-1e. Dry. TD 6,013 ft.

Daube Oil Co. 2 Fee, NW SE SW 4-5s-1e. Dry. TD 4,739 ft. Geol. wildcat.

An-Son Petroleum Corp. 1 Skelton, SE SE NW 9-3s-3w. Dry. TD 9,969 ft.

Comanche County: Wm. H. Atkinson 1 Sweeney, SE SW NE 7-2n-9w. Dry. TD 4,178 ft.

Garvin County: Sinclair Oil & Gas Co. et al 1 Community M. L. Shelton, NE SW 15-3n-4w. IPF 104 BOPD, Hart sand 8,903-34 ft., 39.5°, ¼-in. TD 12,098 ft. (Oil discovery.)

Okfuskee County: Altman Petroleum Co. 1 Dill, NW NE NW 14-11n-8e. Dry. TD 3,970 ft.

W. H. Metzner 1 Curry-Miller, NE NE SW 31-12n-9e. Dry. TD 3,610 ft.

Oklahoma County: Harper-Turner Oil Co. 1 Gardner, SE NE SW 5-13n-2w. Dry. TD 6,286 ft.

Osage County: W. R. Dillard 1 Osage, SW SW NE 18-26n-7e. Dry. TD 2,955 ft.

Glenwood and Sunray Oil Corp. 1 Osage, NE SW SW 6-27n-6e. Dry. TD 3,095 ft.

Pawnee County: Goff-Leeper 1 Harris, SW NW NW 29-21n-4e. Dry. TD 4,305 ft.

Payne County: T. E. Berry 1 Andrews, NW SE SE 28-19n-2e. IPF 40 BOPD, Red Fork sand 4,175-89 ft., 39°, 14/64-in. TD 4,189 ft. (Oil discovery.)

Pontotoc County: Erle C. Halliburton 1 Bumpers "B," NW SE NW 35-4n-4e. Dry. TD 2,614 ft.

Pottawatomie County: Calvert Drilling Co.-Continental Oil Co. 1 Blumenthal, NE NE NE 20-11n-6e. Dry. TD 4,660 ft.

Texas County: R. P. Underwood 1 Flowers, NW NW SE 26-1n-19eCM. IP 11,500 M.c.f. of gas per day, Morrow sand 6,820-40 ft. TD 7,005 ft. (Gas discovery.)

Tillman County: Union Oil Co. of California 1 Medlock, SW NE SW 32-4s-15w. Dry. TD 5,000 ft.

KANSAS

Cowley County: Rex & Morris 1 Mayhill, SE SE SW 20-34s-5e. Dry. TD 3,166 ft.

Rex & Morris 1 Baird, NE NE NW 17-35s-5e. Dry. TD 3,171 ft.

Ellis County: Kantor Oil Co. 1 Hagen, NE NE NW 7-12s-19w. Dry. TD 3,893 ft.

D. R. Lauck 1 Raynesford, C N½ NE SE 28-12s-20w. Dry. TD 3,918 ft.

Graham County: Birmingham & Bartlett 1 Drexler "A," C N½ S½ NE 5-10s-22w. Dry. TD 4,055 ft.

Pawnee County: Petroleum, Inc. 1 Behren, SW SW NW 6-20s-16w. Dry. TD 3,905 ft.

Pratt County: Rupp-Ferguson 1 Brown, SW SW NE 3-29s-15w. Dry. TD 4,836 ft.

Stafford County: National Gas & Oil Co. 1 Tuggle, SW SW NW 17-22s-13w. Dry. TD 3,876 ft.

Trego County: Braden Drilling Co. and NACC 1 Coulson, NW SW SE 11-15s-22w. Dry. TD 4,412 ft.

NEBRASKA

Banner County: U. S. Smelting, Refining & Mining 1 Lovercheck, SW SW NW 19-18n-55w. Dry. TD 6,254 ft. in Skull Creek.

Cheyenne County: Cullum Bros. 1 Jensen, NE NE NW 29-17n-50w. Dry. TD 5,010 ft.

Miracle-Fifer Drilling Co. 1 Nelson, NE NE NE 17-12n-52w. Dry. TD 5,408 ft.

Ohio Oil Co. 1 Eggleston, SE NW SE 26-13n-51w. IPF 3,481 M.c.f. of gas per day, J sand gas discovery, new field. TD 5,136 ft.

H. E. Zoller et al., 1 Bird, NW SW SE 35-16n-50w. Dry. TD 4,845 ft.

Harlan County: Guy F. Atkinson Co. 1 Hauserman, NW NW NE 1-1n-17w. IPP 25 BOPD, Pennsylvanian discovery, new field. TD 3,450 ft. in Lansing-Kansas City.

NORTH DAKOTA

Grand Forks County: A. J. Scott-Ben Larson 1 A. J. and Louella Scott, NE NE 15-151n-53w. Dry. TD 899 ft. in Cambrian.

CALIFORNIA

Fresno County: H. C. Long, Oper. 1-88 "Well," 4-15s-17e. Dry. TD 5,252 ft.

Kern County: General Petroleum Corp. 84-8 Baughman, 8-30s-29e. Dry. TD 5,825 ft.

Richfield Oil Corp. 2 Dodds-Thomas, 23-30s-29e. Dry. TD 6,082 ft.

Southern California Pet. Corp. 45-8 U.S.L., 8-30s-21e. Dry. TD 5,028 ft.

Union Oil Co. 63-29 Seaboard-Saunders, SW NE 29-25s-20e, IPP 20 BPD, 78 per cent water, 26° gravity, perfs. 2,432-93 ft., TD 2,567 ft. (New pool discovery, Etchegoin sand, 4 miles northwest of Lost Hills field.)

Wilrich Development Co. 1 Edwards-Wilrich, 24-29s-20e. Dry. TD 631 ft.

Kings County: W. W. Holmes, Oper. 1-32 Cutter, 32-23s-22e. Dry. TD 3,662 ft.

Orange County: James Ebert et al. 1-1 Aldrich Land, 1-6s-11w. Dry. Repetto 2,565 ft. TD 6,972 ft.

Santa Barbara County: Richfield Oil Corp. 52-22 Russell-A, 22-10n-27w. Dry. TD 6,295 ft.

Stansbury-Webb et al. 1 Spanne, 16-6n-35w. Dry. TD 5,558 ft.

Ventura County: The Texas Co. 1 Sloan, 32-4n-18w. Dry. TD 10,028 ft.

Yolo County: Signal Oil & Gas Co. 1 Monterey-Bell, 4-11n-1e. Dry. TD 5,700 ft.

(Continued on page 207)

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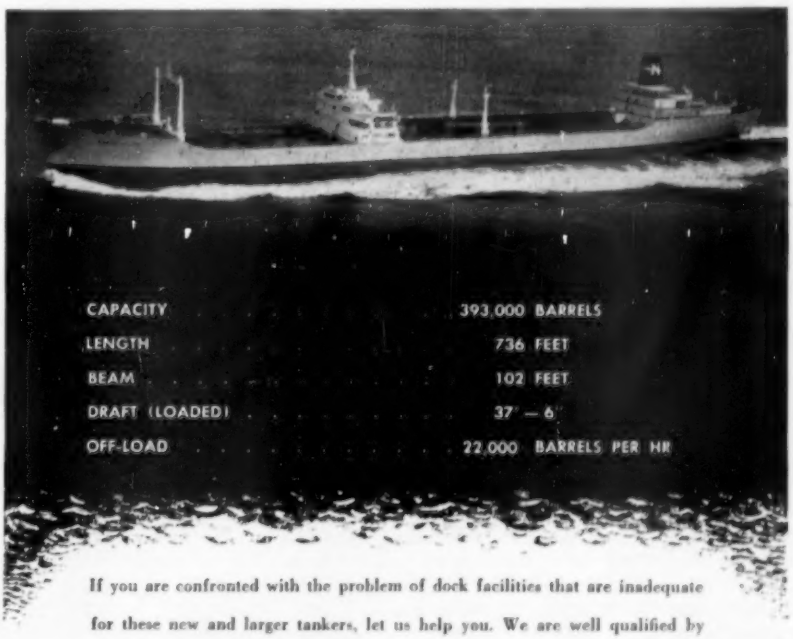

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Exploration Head

Eckis takes over manager's job for Richfield Oil Corp.

IN the career of Rollin Eckis, oil and water have been mixed.

The new manager of exploration for Richfield Oil Corp. has now been in the oil industry 21 years. But after he left college and before he became an oil man, Eckis spent 4 years studying the ground-water problems of southern California.

In his duties, which he took over when Frank A. Morgan resigned, Eckis will be in charge of all the company's exploratory operations, including geology and land acquisitions. These encompass the Pacific Coast area, Rocky Mountains, western Canada, and surveys in which the company is participating in Peru and the Middle East.

Since 1946 Eckis has served Richfield in the capacity of chief geologist. During this period he directed work in connection with some of the company's most significant oil discoveries. Among these were North Coles Levee in 1948, the Cuyama Valley fields in 1948 and 1949, and the Wheeler Ridge Eocene pool in 1952.

In announcing the promotion earlier this month, Charles S. Jones, Richfield president, said Eckis "has made important contributions to the building up of Richfield's oil reserves, and the spirit of youth and vigor he brings to his new assignment will assure his department's continued progress."

A native of Oakland, he graduated from Pomona College in 1927. Two years later he received a master of science degree in geology at the California Institute of Technology. He then undertook ground-water investigations as a special research fellow at Claremont.

His first job upon completing these studies was with the California State Division of Water Resources. After spending 4 years in charge of geological aspects of the survey, Eckis resigned to join The Texas Co. as a petroleum geologist. Three years later, in 1937, he joined Richfield as district geologist at the Bakersfield division headquarters. When he was appointed chief geologist in 1946, he was moved to Los Angeles.

He is a Fellow of the Geological Society of America, and is a member of the American Association of Petroleum Geologists. He was one of the founders of the Petroleum Club of Los Angeles in August 1949, and during 1952 served as its president. His hobbies have varied from trout fishing to a part interest in a small ranch near Bridgeport, on the California-Nevada border.

William B. Nation has been moved from production superintendent with Cooperative Refinery Association at Bartlesville, Okla., to a similar position at Wellington, Kans.

J. D. Booker has been promoted to technical specialist at Humble Oil & Refining Co.'s Baytown, Tex., refinery. Booker joined Humble in 1941 and has served in the technical service division at Baytown since.

Emmett D. Whitis has joined Ada Oil Co. in Houston as chief engineer of the reservoir section, production division. **Von Osinski** has joined Ada and has been assigned to the Midland, Tex., office as a geologist.

W. A. Bilbro, superintendent of operations for the Sohio Petroleum Co. group at Regina, has been elected chairman of the safety committee of the Saskatchewan division of the Canadian Petroleum Association.

Courtney Cook has been appointed production engineer in charge of production and completion for Brown Drilling Co. at Wichita Falls, Tex. He has been production engineer with Great Lakes Carbon Co. at Tulsa.

Einar B. Paust has been named general counsel of Esso Standard Oil Co. Paust joined the company in 1945 following service during World War II with the United States Navy.

Tracy J. Kennedy, petroleum engineer with Magnolia Petroleum Co., has been transferred from Midland, to Electra, Tex.

George Peays, geologist with J. M. Huber Corp., has been transferred from the firm's Borger, Tex., office to Bismarck, N. D.

John Lomax, geologist with Hunt Oil Co., has been moved from the company's Midland, Tex., office to Bismarck, N. D.

R. L. Oakes has been appointed district geologist for Olin Oil & Gas Corp. with headquarters at New Orleans. Oakes before joining Olin had been senior geologist with Stanolind Oil & Gas Co.

E. W. Dissler, manager of exploration for Canada-Cities Service Petroleum Corp. at Calgary, has been transferred to Bartlesville, Okla., as assistant chief geologist for Cities Service Oil Co. **Z. E. Stucky,** who has been assistant to the chief geologist at Bartlesville, has gone to Calgary as manager of exploration for Canada-Cities Service.

E. W. DISSLER

Z. E. STUCKY

A. L. Frye has joined Waterflood Oil Co., South Pasadena, Calif., as a reservoir engineer. For several years he was a consulting engineer at Long Beach, and before that was with Richfield Oil Corp.

Felix Chappellet, former General Petroleum Corp. executive, has been appointed permanent general manager of the Western Oil and Gas Association. Chappellet has been acting head of the body since last November.

Hamilton McKee Johnson has joined Texas Petroleum Co. in Caracas, Venezuela as a geologist. Formerly with Schlumberger Well Surveying Corp. and Seismograph Service Corp., he recently was awarded a Ph.D. degree in geology and geophysics by the University of Oklahoma.

PERSONALS

Arnold Hols has been transferred from Odessa, Tex., to Billings, Mont., as resident engineer for Shell Oil Co.

John W. Best, a geologist for Phillips Petroleum Co. at Amarillo, has resigned to become chief geologist of Amarillo Gas Co.

John B. Benear has joined Cities Service Oil Co., as petroleum engineer and has entered the firm's junior engineering school in Houston.

David Goodwill, former assistant production foreman with Standard Oil Co. of California at Santa Paula, Calif., has been promoted to production analyst in the company's San Francisco office.

E. A. Kistenmacher, Jr., has been promoted by Sun Oil Co. from petroleum engineer at Delhi, La., to district engineer at Tyler, Tex. **Joe Moss,** geologist, has been transferred from the company's Gulf Coast division office at Beaumont, Tex., to the district office at Lafayette, La. Other transfers include: **John Ravenold,** geologist, from the Beaumont division office to the district office at Houston; **Luther Ellison,** petroleum engineer, from the Garcia area of Starr County, Texas, to Delhi, La., as field engineer; **H. R. Christian,** petroleum engineer, from Odessa, Tex., to Garcia area replacing Ellison; **Jerry Eubanks,** junior engineer, from Victoria, Tex., to Odessa; **Ed Stebbins,** geologist, from the Southwest division office at Dallas to the San Antonio district office; and **Joe Sockwell,** geologist, from the San Antonio district office to the Dallas division office.

G. D. Furlow, petroleum engineer in the Venezuelan division of Texas Petroleum Co., has been transferred to the West Coast division of The Texas Co. Recent additions to the Texas Petroleum organization include: **Joseph A. Brooks,** as road construction supervisor, Colombian division; **C. E. Greener,** as geophysicist, Venezuelan division; **Harolde N. Searles,** en engineer, and **Harry G. Bartlett,** as assistant drilling foreman, Colombian division.

Rex L. Livingston, unit petroleum engineer for The Texas Co. at Salem, Ill., has been transferred to Tulsa as administrative assistant. Other Texaco transfers include: **Ross M. Acher,** from assistant district superintendent in Kansas to assistant district superintendent for Oklahoma; **H. L. Murray,** from field foreman at Seminole, Okla., to assistant district superintendent for Kansas; **F. E. Anderson,** from unit foreman at Naval Reserve to foreman at Seminole; **J. E. McDonald,** from foreman at Healdton, Okla., to assistant foreman at Naval Reserve; and **G. E. Krouse,** engineer, from Chase, Kans., to Healdton as production foreman.

J. Lawrence Muir has resigned as vice president and director of Champlin Refining Co., Enid, effective June 21. Muir had been with the company 6 years and had served as chief geologist before becoming vice president.

R. C. GUNNESS

Robert C. Gunness, assistant general manager of manufacturing for Standard Oil Co. (Ind.), has been named general manager of a new transportation and supply department to become effective January 1, 1955. This new main branch of the company will be under **F. O. Prior,** executive vice president.

C. A. Daniels, Earl Griffin, and **Frank Lovering** have been appointed to new area manager positions in Phillips Petroleum Co.'s production department. Daniels will be manager for the central area with divisions in Wichita, Oklahoma City, Ponca City, Okla., and Amarillo, Tex. Griffin will head the southern area with divisions in Shreveport and Houston. Lovering will manage the western area with two divisions at Midland, Tex., and one at Denver.

Joseph M. McLaughlin has been promoted by Magnolia Petroleum Co. from assistant district superintendent of the SACROC district at Snyder, Tex., to district superintendent of the firm's Vanderbilt district. Other promotions and transfers in the Magnolia producing department include: **Clifford F. Willmon,** from assistant petroleum engineer to assistant foreman in the Duncan, Okla., district; **W. E. McNeely,** from junior petroleum engineer in the Dallas petroleum - engineering department to assistant production foreman in the Vanderbilt district; **Ishmael W. Combs,** production foreman, from the Duncan district to the Vanderbilt district; **Ernest B. Etheridge,** production foreman, from Shreveport district to the Lake Charles, La., district; **William R. Adams,** from driller to drilling-tools foreman in the Oklahoma drilling division; **Benjamine F. Dufield, Jr.,** from assistant foreman to marine foreman in the Louisiana-Gulf producing district at Morgan City, La.; **James Sadler,** from the Lake Charles district to the Louisiana-Gulf district as production foreman; **W. L. Broussard,** from drill-

Progress Made on Midwest Research Institute's Building

Midwest Research Institute's new building at Kansas City which will enable the 10-year-old institute to expand its research fields to medicine, fundamental research, education, and information is nearing completion. Among the 21 members of the board of governors of the institute who inspected the work during the recent semi-annual meeting of the institute were: left to right, Kenneth A. Spencer, president of Spencer Chemical Co., chairman of trustees; Miller Nichols, president of J. C. Nichols Co., chairman of the building committee; Harry Moreland, president of Great Lakes Pipeline Co. chairman of the board of governors; and Dr. Charles N. Kimball, president of the institute.

PERSONALS

ing-tools foreman in the Gulf Coast drilling-tools division to marine drilling-tools foreman in the Louisiana-Gulf division; **Ernest W. Hardt,** from assistant foreman to production foreman in the Falfurrias, Tex., district; **Duane C. Waters,** from driller to marine drilling-tools foreman in the Louisiana-Gulf division.

R. S. Guenther, Jr., has been transferred by Lloyd H. Smith, Inc., from Houston to Midland, Tex., as division superintendent for the West Texas area.

William H. Pinckard, president and chairman of the board of directors of California Texas Oil Co., Ltd., has been elected chairman of the executive committee. Pinckard has been associated with the Caltex organization since it was formed in 1936.

James L. Martin, Jr., has been promoted to division geologist for Sinclair Oil & Gas Co. at New Orleans, La. Martin was formerly district geologist for Sinclair at Jackson, Miss.

Harold Burt and **Herbert Harms** have organized the Harms-Burt Drilling Co. at Wichita. Burt was formerly regional manager in Kansas for Westgate-Greenland Oil Co. from 1935 to 1953 and more recently for the company's successor, Natural Gas & Oil Corp. Harms was a partner in Harms & Knight Drilling Co. and is president of Harms Petroleum Co. of Great Bend, Kans.

P. H. Arnot has been made assistant general operations manager for Arabian American Oil Co., in Saudi Arabia, and **O. A. Seager,** manager of the oil operations department. Arnot had been manager of the Abqaiq district; Seager was manager of the exploration division. Other Aramco personnel changes are: **B. Beverly, Jr.,** from assistant manager to manager of the exploration division; **I. J. Reed,** from chief geophysicist to assistant manager of the exploration division; **D. J. Sullivan,** from assistant manager, Dhahran district, to district manager, Abqaiq; **N. A. Scardino,** from assistant district manager, Ras Tanura, to assistant district manager, Dhahran; **W. L. Crampton,** from executive secretary, management committee, to assistant district manager, Ras Tanura.

Ward M. Clark has been named production engineer for Tennessee Production Co. at Wichita Falls, Tex. Clark was formerly an engineer with W. A. McGinnis at Eureka, Kans.

Joseph H. Robbins has taken a position as geologist with Walter Duncan Oil Properties at Mt. Vernon, Ill. Before joining Duncan, Robbins was with Union Oil Co. of California at Bismarck, N. D.

M. W. Collins, field manager for **K. T. Wiedemann,** has been transferred to Caney from El Dorado, Kans. Collins will direct operations in southeastern Kansas and northeastern Oklahoma. **Carl Hankerson** will replace Collins at El Dorado.

W. K. Smith, Ohio Oil Co., has been appointed assistant division superintendent of the company's Martinsville, Ill., division. Formerly superintendent in charge of construction and maintenance at Martinsville, he has been with the company 35 years.

Dr. Ionel I. Gardescu has been named Houston manager for the new office of H. Zinder & Associates, Inc. Gardescu spent several years abroad as geologist for the Romanian subsidiary of Standard Oil Co. (N. J.) and also served as a senior petroleum engineer and geologist for The Texas Co.

H. G. SCHENCK

Dr. Hubert G. Schenck, former head of the micropaleontology department at Stanford University, has been decorated by the president of the Republic of China for his valuable service to the Chinese people and government during his 3 years as chief of the Mutual Security Mission to China. Chinese Ambassador **V. K. Wellington Koo** made the presentation of the decoration of Ching Hsing (Auspicious Star) in Washington.

Robert S. Moehlman has been promoted to executive vice president of Austral Oil Exploration Co., Houston. Moehlman had been serving as vice president and member of the board of directors at the time of his promotion. **James H. McGuirt,** chief geologist with Austral, has been elected vice president of the company. **C. Wardell Leisk,** who has been serving as general superintendent for Austral, was also elected a vice president.

Jack Miller, senior engineer with the gas department of the Texas Railroad Commission in Austin, has been transferred to the Pampa, Tex., district office as field engineer.

Kenneth D. Alpiger, has joined the American Association of Oilwell Drilling Contractors at Dallas to handle the association's transportation, tax, accounting, and insurance matters. Alpiger, prior to joining A.A.O.D.C., had been employed by Atlantic Refining Co. in its drilling, accounting, and valuation departments.

M. C. Jones, assistant general superintendent for Mid-Continent Pipe Line Co. in Tulsa, will assume supervision of crude-oil traffic effective July 1. In other promotions **R. L. Cowan,** foreman of gagers in Tulsa, will succeed **O. E. Bryant** as district superintendent at Wewoka, Okla. Bryant has been promoted to assistant general superintendent in Tulsa.

John S. Russell, superintendent of the Vanderbilt district of Magnolia Petroleum Co., has been transferred to the Dallas office as management assistant in charge of producing department emplove relations. Other Magnolia changes include: **James L. Shinn,** from driller to marine drilling-tools foreman in the Louisiana-Gulf division; **Martin L. Talley,** from Healdton district to Duncan, Okla., district as petroleum engineer; **J. Paul Fly,** as petroleum engineer from the Duncan to the Cushing, Okla., district; **Paul E. Irwin,** petroleum engineer, from the Cushing to the Healdton, Okla., district; **T. Griffith,** junior petroleum engineer, from the Rodessa district to the Louisiana-Gulf district; **Billy P. Clark,** junior petroleum engineer, from the Louisiana-Gulf district to the Rodessa district; **Rabey J. Funk,** junior petroleum engineer, from the Midland, Tex., district to the Duncan district; **Melvin Kaitz,** from junior petroleum engineer to petroleum engineer in the Vanderbilt district; **John S. Awezec,** from junior petroleum engineer to petroleum engineer in the Louisiana-Gulf division; **R. L. Wilson,** from junior petroleum engineer to petroleum engineer in the Duncan district; **William N. Richardson,** from junior petroleum engineer to petroleum engineer in the Wewoka, Okla., district.

PERSONALS

New A.P.I. Eastern District Production Officers Elected

Eleven officers to serve the 1954-55 terms were elected at White Sulphur Springs, W. Va., recently by the eastern district of American Petroleum Institute's Division of Production. The new officers are: (left to right), front row, R. L. Bird, Jr., Columbian Carbon Co., Charleston, W. Va., outgoing chairman; Paul G. Benedum, new chairman, Hiawatha Oil Co., Pittsburgh; Harry M. Brown, Chartiers Oil Co., Pittsburgh, named secretary-treasurer; and James M. Bird, Bird Well Surveys, Bradford, Pa. Rear row: Fred C. Newman, Old National Bank, Evansville, Ind.; J. Robert Hornor, Delaware Gas Co., Clarksburg, W. Va.; Lysle R. Kirk, The Ohio Fuel Gas Co., Columbus, Ohio; and Richard J. Murdy, New York State Natural Gas Co., Pittsburgh, Pa. Absent from picture are: Jack Cashell, Preston Oil Co., Columbus, Ohio; O. L. Martin, McClure Oil Co., Alma, Mich.; and Douglas Rogers, Jr., South Penn Oil Co., Bradford, Pa. All but R. L. Bird, Benedum, and Brown are district vice chairmen.

David W. Harris, president of Universal Oil Products Co., has been awarded the Georgia Tech alumni distinguished service award for 1954.

E. L. Chapin, former petroleum engineer at Fort Worth for Stanolind Oil & Gas Co., has been named farm boss at North Cowden, Tex., for Stanolind.

J. W. Watkins has been appointed assistant to **George M. Washington,** vice president in charge of oil development for Northern Pacific Railway Co., at Billings, Mont.

R. L. Sielaff has been appointed assistant exploration manager of Bay Petroleum Co. at Denver. Sielaff was formerly assistant to the chief geologist of Sinclair Oil & Gas Co. at Tulsa.

H. T. Dodge has been named general manager of The Texas Co.'s foreign operations department. **C. W. Saville** has been appointed assistant to the vice president of the company's foreign operations succeeding Dodge.

Dr. John C. Michaelson, formerly of the department of geology at Washington State College, Pullman, Wash., has joined Sohio Petroleum Co., as staff geologist at Lewistown, Mont. **Walter Praetorius,** also of Washington State College, is engaged as a field assistant in the Wyoming area.

Lloyd G. Smith, vice president of Creole Petroleum Corp., has been re-elected president of the Venezuelan Chamber of Commerce of the United States.

Andre H. Menuet, chief engineer of the Skelgas division, Skelly Oil Co., has been named association treasurer of the Liquefied Petroleum Gas Association. Prior to this promotion Menuet served for 2 years as chairman of the L.P.G.A. technical and standards committee.

W. F. Moore, former president of Arabian American Oil Co., has been elected a member of the board of directors of the Federal Bank of Lebanon, one of the largest banks in the Middle East. Since his retirement as Aramco's president several years ago, Moore has been an industrial consultant living in Beirut.

James C. Booth, Lion Oil Co., has been advanced from production foreman to production superintendent for the Colorado production district at Fort Morgan. **Johnny Murphy, Jr.,** formerly of Norphlet, Ark., has joined Lion as petroleum engineer in Fort Morgan. **Robert S. Haigh** is a new geologist in the Billings, Mont., district office. **John H. Dayvault** and **Lester Livingston, Jr.,** have entered the Casper district office as junior geologists.

Carroll M. England, former division geophysicist for Union Oil Co. of California at Bismarck, N. D., has been transferred to a similar position at Tulsa.

William P. Von Osinski has joined Ada Oil Co. as a member of the geological staff in the Midland, Tex., district office. Von Osinski formerly worked with Klaus Exploration Co., Skelly Oil Co., and Honolulu Oil Corp. in the Permian basin.

Frank V. Williams, assistant superintendent of Socony-Vacuum Oil Co.'s Olean refinery, will succeed **Walter E. Wanner** who retires July 1 as superintendent. Williams will remain in charge of the Olean operations until the plant is closed down in several months.

DEATHS

Greef C. Murray, 54, Newcastle, Wyo., oil producer, died in Trinidad, Colo., June 18 while en route from Newcastle to Midland, Tex.

Joe McClinton, 61, oil operator at Vernon, Tex., died June 15 from injuries incurred in traffic accident near Electra, Tex.

James O. Lewis, 68, petroleum engineer, geologist, and a partner in Petroleum Consultants, died June 15 in Houston. Lewis was recipient of the Anthony F. Lucas Medal of the American Institute of Mining and Metallurgical Engineers in 1946.

Robert G. Roberts, 61, technical engineer of the Barrett Division of Allied Chemical & Dye Corp., died in Chicago June 16. He was prominent in the development of pipeline protection methods.

Francis David (Frank) Bovaird, 67, executive vice president of Bovaird Supply Co., died June 18 in Tulsa. Bovaird was a member of the third generation in the Bovaird family, which entered the oil-field supply business in 1871. A brother, D. D. Bovaird, is president of the company.

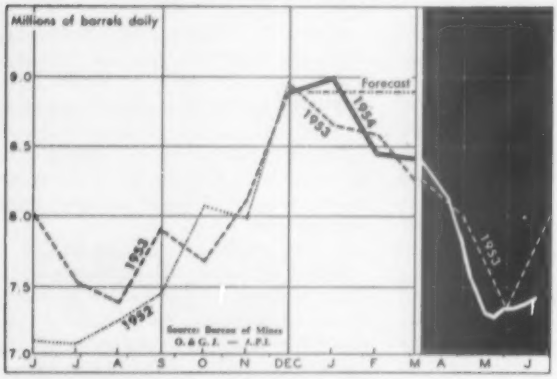
Herbert J. Reuwer, 58, production foreman for Sun Oil Co. at Quitman, Wood County, Texas, died June 22 in Quitman. Reuwer had served with Sun for 33 years, 6 of them in South America.

Latest Figures . . Industry Trends

A QUICK LOOK AT THE HIGHLIGHTS

	LATEST WEEK	Change from WEEK AGO		Change from YEAR AGO	
Production	6,480,450	UP	11,350	DOWN	129,400
Crude stocks	276,185,000	DOWN	2,364,000	DOWN	2,775,000
Completions	987	DOWN	122	DOWN	8
Refinery runs	6,893,000	UP	73,000	DOWN	170,000
Gasoline stocks	169,186,000	DOWN	2,117,000	UP	21,042,000
Four-product stocks	324,302,000	UP	2,167,000	UP	23,899,000
Total imports	974,000	UP	174,800	UP	38,000

TOTAL DEMAND—ALL OILS



Drop in Rig Activity May Foretell Summer Slump in Well Completions

WEEKLY reports of rotary rigs active in the United States, compiled by Hughes Tool Co., indicate some slowing down in drilling activity for the past 6 weeks.

Rotary rigs operating in the United States averaged 2,547 for the past 6 weeks compared with 2,601 for the same weeks last year. This reduction from last year was not due to an actual decrease in rig activity compared with earlier months of this year but to a failure to increase activity this year in May and June. The average for the past 6 weeks is almost identical with the average for the year to date. The average for the corresponding 6 weeks last year was 2,601 rigs, representing a gain of 75 rigs over the year's average through the third week of June.

Year's average up . . . The average of reports for the first 25 weeks of this year shows 2,546 rigs operating in the United States. However, this total represents an increase of only 0.8 per cent over the same weeks last year compared with a gain in well completions of 11.3 per cent.

Since operators drilled 7.5 per cent more wells in 1953 than in 1952 with 1.0 per cent fewer rotary rigs, the recent decline in rotary activity may not pull the well-completion total much below the average for last summer.

If the number of active rigs stays near the current level, well completions in the last half of the year will not show the large percentage gain over the last half of 1953 that has been recorded for the first half of this year.

Year's gain in first half . . . Even if completions in the last half of the year show no gain over the same period last year, the total for the year will still represent an increase of 5.0 per cent over 1953.

Total completions through June 19 amounted to 24,826 wells for a gain of 2,500 wells over the same weeks of last year. Most of the gain was in the first 4 months, but the increase built up in these months was enough to make a very good percentage gain for the entire year.

Gains in completions for Oklahoma, Illinois, North Louisiana, Colorado, and Wyoming account for the entire increase. Also, all of the increase has been in development drilling. The cumulative total for wildcat completions is running slightly less than last year.

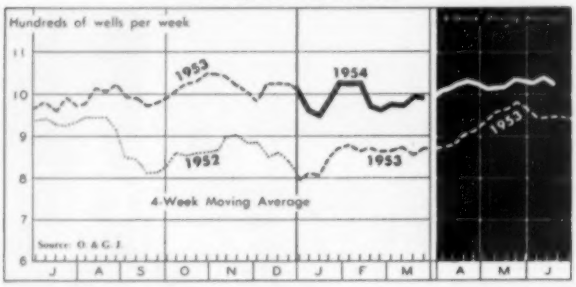
Market trends . . . Heavy fuel continues to gain some strength on the Group 3 market. Some material is moving to the Gulf Coast with a netback of about $1.00 per barrel. Sales for northern movement are reported to be at $1.00 or above.

Gasoline movement out of terminals have been very good but the heavy burden of excessive inventories prevents any gain in market prices.

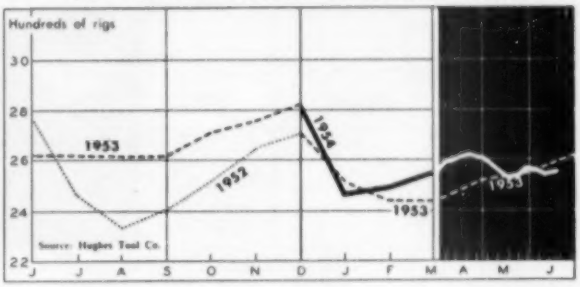
Standard Oil Co. (Ohio) announced the third reduction in tank-wagon gasoline prices, effective June 17. The latest cut brings the total reduction to 1.0 cent a gallon.

Some shading of kerosine and distillate prices has been reported for both the Gulf Coast and parts of the East Coast. Kerosine and distillate stocks are slightly less than last year.

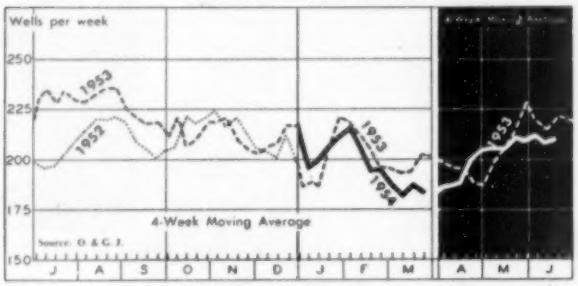
TOTAL COMPLETIONS



ROTARY RIGS OPERATING IN UNITED STATES



WILDCAT COMPLETIONS



ACTIVE ROTARY RIGS

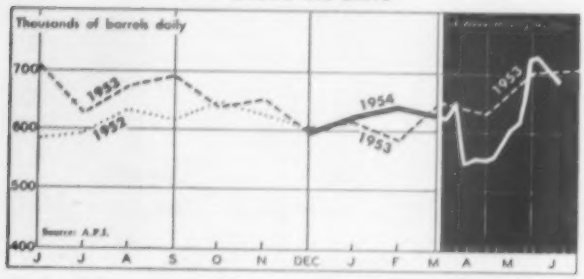
Area—	6-21-54	Change from 6-14-54	Change from 6-22-53
Gulf Coast	555	4	—45
N. and W. Texas-New Mexico	816	26	— 5
Arkansas-N. Louisiana-E. Texas	172	2	22
Oklahoma	310	—30	—16
Kansas-S. Nebraska	165	— 5	— 1
Illinois-Eastern	147	12	— 4
Rocky Mountain	260	9	— 3
Pacific Coast	137	6	—36
Total United States	2,562	24	—88
Western Canada	106	— 7	—89

WEEKLY WELL COMPLETIONS . . . WEEK ENDED JUNE 19, 1954

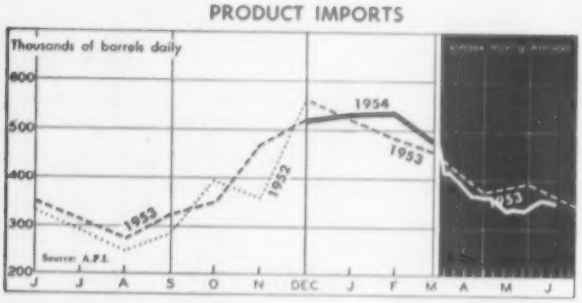
	Total of all wells: Comp.	Oil	Gas	Dry	Footage	Cum. 1954	Cum. 1953	Wildcat completions and discoveries: Oil	Dist.	Gas	Dry	Total	Cumulative total, 1954: Oil	Dist.	Gas	Dry	Total
Ala.-Ga.-Fla.	3	0	0	3	23,372	51	65	0	0	0	3	3	2	0	2	41	45
Arkansas	9	5	0	4	31,298	293	208	1	0	0	1	2	14	0	4	46	64
California	41	29	0	12	185,527	1,156	1,227	1	0	0	11	12	36	1	6	250	293
Colorado	27	6	3	18	154,405	607	264	1	0	3	16	20	18	0	6	229	253
Illinois	59	29	0	30	140,266	1,288	814	0	0	0	11	11	5	0	0	200	205
Indiana	12	7	0	5	16,358	362	548	0	0	0	3	3	5	0	0	79	84
Kansas	78	41	6	*31	263,002	2,073	2,344	0	0	0	9	9	36	0	9	273	318
Kentucky	26	15	5	6	43,303	526	479	1	0	0	2	3	10	0	1	55	66
Louisiana	55	42	3	10	326,598	1,573	1,184	2	2	0	5	9	50	31	15	139	235
North	35	27	3	5	119,830	863	484	0	0	0	4	4	5	3	6	56	70
South	20	15	0	5	206,768	710	700	2	2	0	1	5	45	28	9	83	165
Michigan	22	8	0	*14	71,010	259	244	0	0	0	8	8	8	0	0	106	114
Mississippi	8	0	1	7	56,728	182	172	0	0	0	4	4	4	0	0	66	70
Montana	8	4	0	4	20,887	134	178	0	0	0	1	1	1	0	1	35	37
Nebraska	13	7	1	5	70,440	166	151	1	0	1	4	6	11	0	2	51	64
New Mexico	11	8	3	0	58,900	490	642	0	0	0	0	0	9	0	6	58	73
North Dakota	5	4	0	1	34,662	113	118	0	0	0	1	1	3	0	0	39	42
Ohio	19	9	6	4	41,599	532	472	0	0	0	0	0	3	0	4	9	16
Oklahoma	164	102	7	55	569,904	4,402	3,402	3	0	1	14	18	58	2	14	292	366
Pennsylvania-New York	43	16	9	†18	96,886	1,137	1,097	0	0	1	4	5	0	0	5	19	24
Texas	337	178	19	140	1,542,634	8,478	8,078	14	4	4	94	116	354	38	71	1,936	2,399
Southwest (1 & 4)	56	20	3	33	217,715	1,213	1,335	6	2	1	22	31	61	20	19	335	435
Gulf Coast (2 & 3)	56	21	5	30	357,699	1,260	1,191	0	2	2	19	23	36	13	21	306	376
East (5 & 6)	23	6	2	15	123,166	438	388	0	0	0	10	10	8	0	6	126	140
North Central (7-B & 9)	114	71	1	42	352,012	3,180	2,974	4	0	0	27	31	143	4	8	798	953
West (7-C & 8)	66	48	2	16	411,497	1,940	1,799	4	0	1	13	18	105	0	12	329	446
Panhandle (10)	22	12	6	4	80,545	447	391	0	0	0	3	3	1	1	5	42	49
Utah	0	0	0	0	0	28	34	0	0	0	0	0	2	0	1	14	17
West Virginia	14	3	10	1	34,252	247	263	0	0	1	0	1	0	0	13	7	20
Wyoming	31	14	0	17	131,466	650	285	0	0	0	7	7	25	0	3	89	117
Miscellaneous (S. D., Nev.)	2	1	0	1	18,188	79	28	1	0	0	1	2	2	0	0	12	14
Total United States	**987**	528	73	386	3,931,685	24,826	22,297	25	6	11	199	**241**	656	72	163	4,045	4,936
Total previous week	1,109	649	80	380	4,433,821			27	2	10	160	199	631	66	152	3,846	4,695
Total June 20, 1953	995	538	61	396	4,049,628			35	3	6	194	238	668	47	175	4,124	5,014

Service wells included: *1, †16.

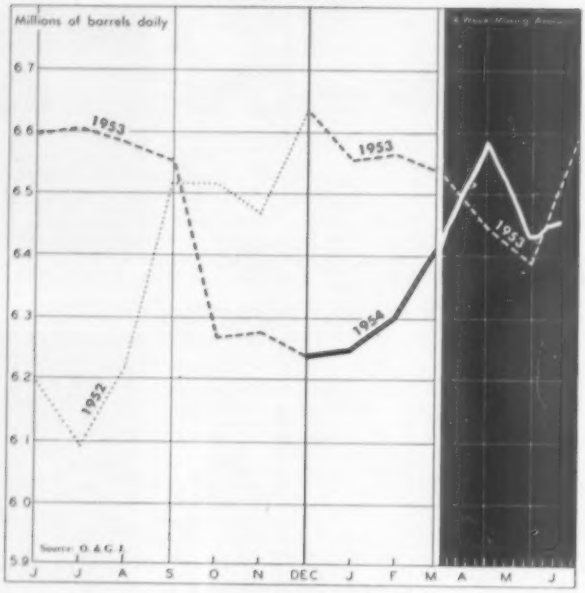
CRUDE IMPORTS



PRODUCT IMPORTS



CRUDE-OIL PRODUCTION

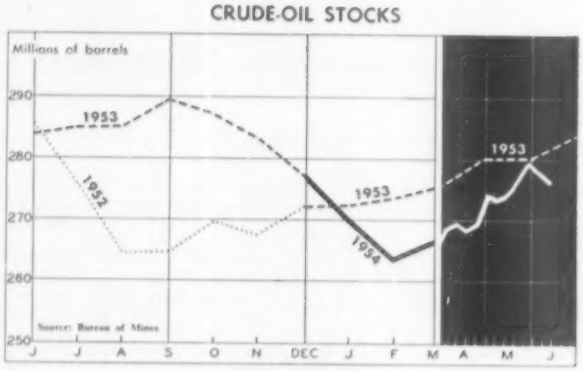


DAILY AVERAGE PRODUCTION FOR WEEK

	June 19 Crude oil	June 19 Lease condensate	June 19 Total	June 12 total
Alabama	4,500		4,500	4,500
Arkansas	76,950	550	77,500	77,950
California	989,500		989,500	990,100
Colorado	128,000		128,000	123,900
Eastern	55,000		55,000	55,000
Florida	1,650		1,650	1,650
Illinois	187,100		187,100	187,100
Indiana	28,400		28,400	30,100
Kansas	329,200		329,200	323,900
Kentucky	37,600		37,600	37,500
Louisiana	667,000	43,500	710,500	710,500
North	109,000	3,500	112,500	112,500
South	558,000	40,000	598,000	598,000
Michigan	34,600		34,600	33,000
Mississippi	89,650	3,300	92,950	91,350
Montana	37,400		37,400	35,800
Nebraska	18,800		18,800	18,600
New Mexico	205,300	1,750	207,050	207,050
North Dakota	14,900		14,900	14,600
Oklahoma	504,500		504,500	506,000
Texas	2,725,500	50,000	2,775,500	2,775,500
Dist. 1	43,700	400	44,100	44,100
Dist. 2	143,500	7,100	150,600	150,600
Dist. 3	434,800	24,250	459,050	459,050
Dist. 4	248,000	5,850	253,850	253,850
Dist. 5	45,700	450	46,150	46,150
Dist. 6	114,000	5,200	119,200	119,200
East Texas field	236,000		236,000	236,000
Dist. 7-B	119,300	25	119,325	119,325
Dist. 7-C	185,600	4,600	190,200	190,200
Dist. 8	881,900	1,700	883,600	883,600
Dist. 9	193,000	400	193,400	193,400
Dist. 10	80,000	25	80,025	80,025
Utah	5,400		5,400	5,300
Wyoming	240,400		240,400	239,700
Total U. S.	6,381,350	99,100	**6,480,450**	6,469,100
Change from previous week			up **11,350**	
Canada	289,375		289,375	224,950
Total U. S. production January 1-June 19			1,093,268,950 bbl.	
Same period last year (crude plus cond.)			*1,106,366,194 bbl.	

*Includes 15,794,725 bbl. condensate.

CRUDE-OIL STOCKS



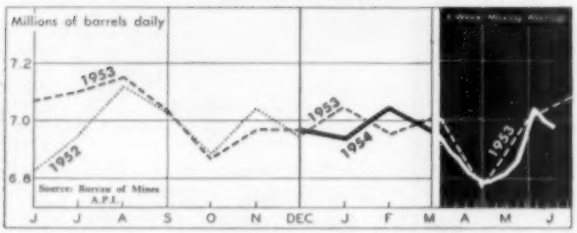
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

(Thousands of barrels)

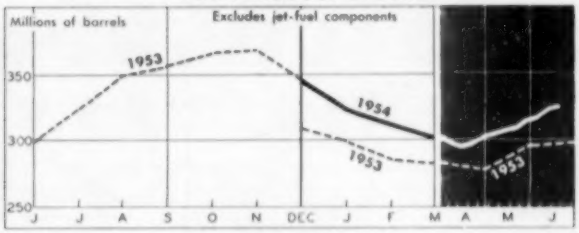
	June 12, '54	June 5, '54	June 13, '53
Pennsylvania Grade	3,190	3,187	2,640
Other Appalachian	1,925	1,885	2,293
Illinois, Indiana, Michigan	12,891	12,681	11,858
Kansas	9,878	9,733	9,493
Oklahoma	27,059	27,222	29,969
Arkansas	3,381	3,255	2,697
Louisiana	16,163	16,345	15,828
North	2,520	2,420	2,585
Gulf	13,643	13,925	13,243
Mississippi	3,211	3,074	3,752
New Mexico	7,203	7,458	7,198
Texas	128,206	129,565	132,398
East Texas proper	12,294	12,211	11,158
West Texas	54,424	55,241	62,189
Texas Gulf	28,660	28,870	26,335
Other Texas	32,828	33,243	32,716
Wyoming	13,289	13,503	14,154
Other Rocky Mountain	4,282	4,239	3,485
California	32,881	32,833	32,461
Foreign	†12,626	13,569	10,734
Total	276,185	278,549	278,960

*Bureau of Mines. †Includes 2,661,000 bbl. in California.

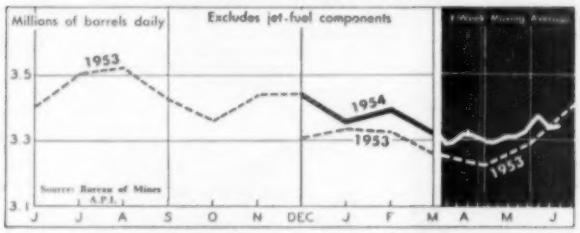
REFINERY RUNS



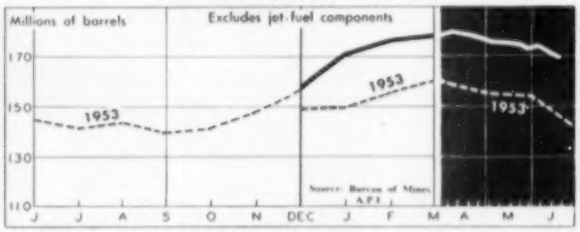
FOUR-PRODUCT STOCKS



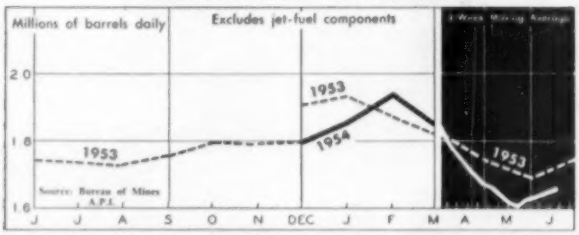
GASOLINE PRODUCTION



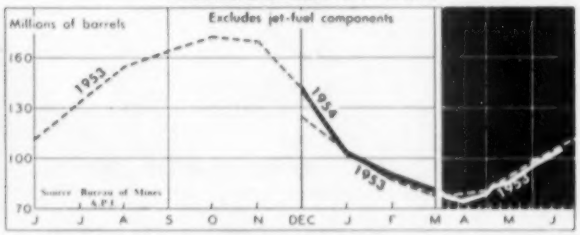
GASOLINE STOCKS



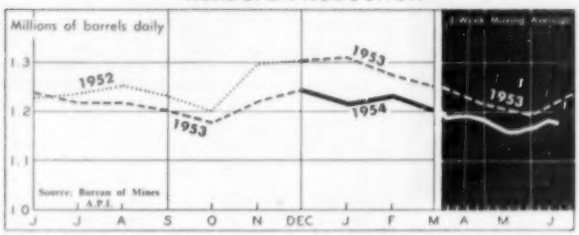
MIDDLE-DISTILLATE PRODUCTION



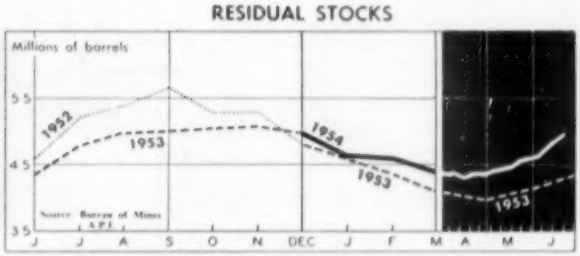
MIDDLE-DISTILLATE STOCKS



RESIDUAL PRODUCTION



RESIDUAL STOCKS



A.P.I. REFINERY REPORT, JUNE 18

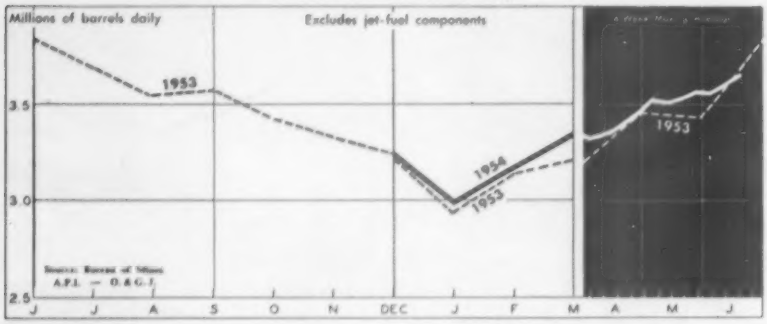
(Excludes all jet-fuel components)

(Thousands of barrels)

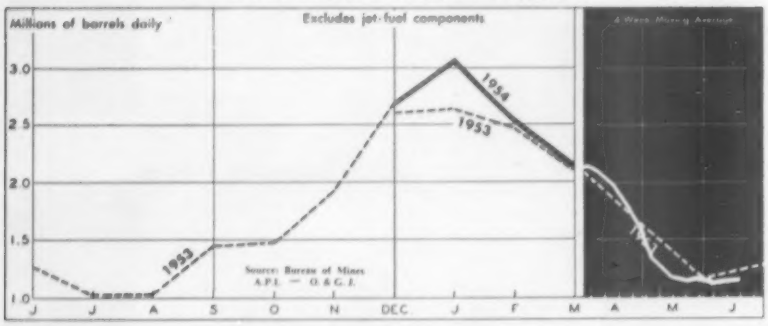
District—	Daily avg. runs	Daily average production—Gaso.*	Kero.	Dist.	Resid.	Stocks‡—Gaso.†	Kero.	Dist.	Resid.	Bureau of Mines, June 1953—Daily avg. runs	Daily average production—Gaso.*	Kero.	Dist.	Resid.
East Coast	1,039	412.6	28.3	218.7	200.3	37,212	10,668	26,952	9,359	1,077	419.4	37.2	256.9	240.5
Appalachian:														
District 1	109	46.6	2.6	24.4	9.6	4,382	441	1,375	482	108	45.3	4.8	18.1	13.8
District 2	95	54.7	1.7	7.7	11.3	2,764	379	625	381	90	45.1	5.2	11.3	12.1
Ind., Ill., Ky.	1,246	664.9	69.0	216.1	166.3	37,637	5,758	14,901	4,447	1,252	668.8	70.6	211.3	162.8
Okla., Kans., Mo.	640	366.0	18.4	131.0	43.0	17,535	1,428	8,909	1,338	630	353.0	18.3	146.6	45.4
Inland Texas	234	165.0	11.1	37.0	22.4	6,554	415	1,396	1,301	258	169.4	9.5	44.0	33.3
Texas Gulf Coast	1,632	802.1	98.6	330.0	221.7	21,073	3,140	8,016	4,429	1,710	811.4	104.2	393.0	255.3
La. Gulf Coast	546	264.4	60.6	124.6	42.7	8,398	2,307	3,601	1,361	579	290.3	40.3	144.9	57.2
N. La. and Ark.	81	36.0	7.3	18.6	6.3	3,676	706	1,040	168	87	31.2	7.2	21.7	7.1
Rocky Mountain:														
New Mexico	19	12.0	1.0	3.0	2.7	227		71	28	20	12.6	0.4	3.0	4.1
Other Rocky Mtn.	254	130.2	4.6	55.3	37.7	8,339	231	2,093	854	239	113.1	2.5	52.1	42.0
California	998	415.1	9.1	161.0	388.9	21,389	469	11,175	24,872	1,031	450.2	6.5	137.5	364.8
June 18, 1954	6,893	3,369.6	312.3	1,327.4	1,152.9	169,186	25,942	80,154	49,020	7,081	3,409.8	306.7	1,440.4	1,238.4
June 11, 1954	6,820	3,276.3	247.0	1,398.9	1,207.9	171,303	24,807	77,495	48,530					
June 20, 1953	7,063	3,306.1	318.0	1,421.0	1,243.0	148,144	26,067	82,255	43,937					

*At refineries including natural blended. †Finished and unfinished. ‡At refineries, bulk terminals, in transit, and in pipe lines.

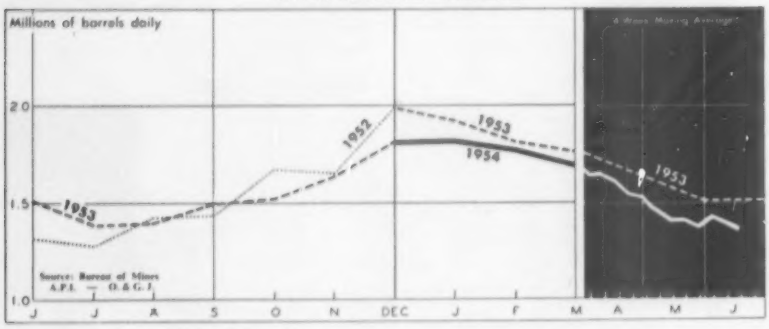
TOTAL GASOLINE DEMAND



TOTAL MIDDLE-DISTILLATE DEMAND



TOTAL RESIDUAL DEMAND



REPRESENTATIVE QUOTATIONS

Spot-market quotations of leading suppliers as of June 23, 1954. Prices are in cents per gallon, except for residual in dollars per barrel and wax in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline	10.75-11	11.5-12.25	10.25-10.5
Premium gasoline	11.75-12	13.25-14	11.5-12.0
42-44 w.w. kerosine	9-9.25	9.75-9.95	8.875-9
No. 2 straw fuel oil	8.125-8.25	8.75-8.95	7.875-8
No. 6 residual	$1.00-1.10	$2.20-2.40	$1.85-1.95

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	4.5	4.0	4.25
Grade 18-55	5.4	4.9	5.15

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	18
200 vis., No. 3 neutral, 0-10 pp.	13.25

WAX

Mid-Continent

132-134 A.M.P.	6.0

• Standard Oil Co. (Ohio) announced the third reduction in dealer tank-wagon gasoline prices, effective June 17, for a total cut of 1.0 cent a gallon. Reports of discounts off postings for light heating oils continue on the Gulf and East Coast.

PRODUCTION AND DEMAND—MAJOR PRODUCTS

(Thousands of barrels daily)

	Refinery prod.	Total demand
Gasoline:		
Four weeks ended 6-18-54	3,343	3,656
March 1954	3,261	3,331
February 1954	3,365	3,182
June 1953	3,410	3,838
Middle distillate:		
Four weeks ended 6-18-54	1,663	1,135
March 1954	1,811	2,240
February 1954	1,957	2,417
June 1953	1,747	1,280
Residual fuel:		
Four weeks ended 6-18-54	1,177	1,380
March 1954	1,169	1,667
February 1954	1,241	1,753
June 1953	1,238	1,506

CRUDE PRICES GRAVITY SCHEDULE

	Signal Hill, Calif.*	Okla-homa, Kansas	Gulf Coast Tex.†	West Tex.‡
14-14.9	$1.87	....	....	....
15-15.9	1.93	....	....	....
16-16.9	1.99	....	....	....
17-17.9	2.05	....	....	....
18-18.9	2.11	....	....	....
19-19.9	2.18	....	....	....
20-20.9	2.24	$2.50	....	$2.37
21-21.9	2.30	2.52	....	2.39
22-22.9	2.37	2.54	....	2.41
23-23.9	2.45	2.56	....	2.43
24-24.9	2.53	2.58	$2.91	2.45
25-25.9	2.61	2.60	2.93	2.47
26-26.9	2.69	2.62	2.95	2.49
27-27.9	2.76	2.64	2.97	2.51
28-28.9	2.83	2.66	2.99	2.53
29-29.9	2.91	2.68	3.01	2.55
30-30.9	2.97	2.70	3.03	2.57
31-31.9	3.04	2.72	3.05	2.59
32-32.9	3.12	2.74	3.07	2.61
33-33.9	....	2.76	3.09	2.63
34-34.9	....	2.78	3.11	2.65
35-35.9	....	2.80	3.13	2.67
36-36.9	....	2.82	3.15	2.69
37-37.9	....	2.84	3.17	2.71
38-38.9	....	2.86	3.19	2.73
39-39.9	....	2.88	3.21	2.75
40 and above	....	2.90	3.23	2.77

*Standard Oil Co. of California. †Upper Texas Gulf Coast. ‡Includes New Mexico Permian.

Prices east of California effective June 15, 1953. California prices effective February 16, 1953. Pennsylvania Grade prices effective May 20, 1954.

FLAT CRUDE PRICES

Representative posted schedules per barrel.

Louisiana:	
Cotton Valley (distillate)	$3.00
Cotton Valley (Holloway crude)	2.95
Texas:	
East Texas	2.90
Chapel Hill	2.83
Conroe	3.13
Van	2.73
Pennsylvania Grade:	
Bradford	3.00-3.26
Middle District	3.20
Southwest Pennsylvania	2.81
West Virginia	2.75
Ohio	2.74
Illinois Basin	3.02

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WILSON GIANT—Serial No. 6383. Sales Price—$6,000. Equipped with Two Waukesha 145 GK Engines in good condition. General Appearance—Fair. Rig used for Work-Over. Price includes Kelco Spinning and Foster Breakout Catheads; Stromberg - McCreary Air Starters on Engines. Brakes circulating water-cooled; Manual Friction Clutches in Transmission; Others — Jaw Clutches. Rig has Slush Pump Drive and Rotary Drive. Location of Unit—Lake Charles, Louisiana. Contact Cardwell, Houston.

FOR SALE: Model KL 153 Cardwell double drum drilling in unit with UD 24 diesel International engine, Brown-Lipe 4-speed transmission, double pole mast, complete with tools and other equipment. Drilling near Independence, Kansas—THE VEEDER SUPPLY & DEVELOPMENT CO., Cherryvale, Kansas.

SALES and rentals of cable drilling and fishing tools, casing and equipment, from the Southwest's largest stock of used cable tools and oil field supplies. Degen Pipe and Supply Co., Tulsa, Oklahoma.

FOR SALE: New and used Pipe—7", 9⅝", 10¾", 16", 24"; from 20' to 60' lengths. Caterpillar 8800 Power Unit with generator set. 125 KW Generator with Buffalo Natural Gas Engine, new, complete, $2800.00. 210 CFM Air Compressor mounted on KB-8 tandem truck; A-1 condition, $2800.00. Buckeye ¾ yd. Crane, $2750.00. Eugene Ashmus, P. O. Box 391, Kenosha, Wis., Phone 2-1743.

Gaso Duplex 4½" x 6" Power Pumps with Chrysler C-36 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units. Westinghouse 20-25-50 KW Generating Units.
H. H. COFFIELD
Attn.: W. H. ORR
Phones: 132—Rockdale, Texas
AT-3427—Houston, Texas

PIPE

126,672 feet 8⅝" O.D. 28.55 pounds per foot.
36,325 feet 12¾" O.D. 49.56 pounds per foot.

The above reconditioned steel pipe is machine cleaned, straight, beveled for welding in 20 foot random lengths.

NEW ELECTRIC WELD PIPE

Outside Diameter	Wall Thickness	Quantity In Feet
8⅝"	.352"	1000
9⅝"	.385"	4200
16"	.375"	4800
20"	.281"	2400
24"	.406"	1600
26"	.312"	4200
30"	.375"	1200

This is structural grade pipe in 40 foot lengths.

All pipe is suitable for gas, water and oil, as well as for culverts, piling and structural purposes.

FOR SPECIAL QUANTITY PRICES WRITE, WIRE OR PHONE
SONKEN-GALAMBA CORPORATION
2nd and Riverview (X-163)
Kansas City 18, Kansas
ATwater 9305

FOR SALE EQUIPMENT

MODEL H CARDWELL Servicing Unit. Truck mounted with mast. Fully equipped. Box No. 1 or Phone 153, Canton, Kansas.

DRILLING equipment. New and used spudders, rotaries, tools. Everything for well drilling. Fishing tools rented. Pressey & Son, Pueblo, Colorado.

FOR SALE: 12,000' 4" o.d. seamless line pipe. 40' random lengths. Clean inside and out. Beveled ready to lay 35c f.o.b. our yard. M. J. Regan Pipe Co., Coffeyville, Kans.

FRANKS MODEL 5000 Spudder — Serial No. 866. Sales Price—$7,500. Equipped with one Cummins HB1-600 Engine in good condition. Brake Rims in fair condition; Brake blocks—Good. General appearance—Good. Chains—Good. Basic Machine equipped with Spudding attachment, Skid and 65' Double Leg Pipe Mast with 8⅝" and 7" Pipe Legs; 4-Sheave Crown of Wilson Manufacture. Price includes Mast Guy Lines. Location of Unit — Western Kansas. Contact Cardwell, Wichita.

FOR SALE
12" PIPE LINE

125,000'—12¾ O.D. .375 Wall
49.56 lb. Lapweld

All machine cleaned, commercially straight, 20' single random lengths, ends beveled, used, 1st class condition. Suitable installation—oil, water, or gas pipeline systems. 850# to 900# PSI. Large additional quantities, same size, process, taking up, and reconditioning. Priced attractively, for prompt shipments, Welda, Kansas, and Grandview, Mo.

Write, Wire, Phone

HUMBOLDT-CHICAGO PIPELINE PROJECT
125 W. 3rd St. Tulsa, Okla.
Phones 2-9128—54-4229

FOR SALE EQUIPMENT

FOR SALE: Model "K" Cardwell tubing and rod unit complete with tubing and rod tools, mast, mounted on Ford tandem truck. Melco Drilling Company, Seminole, Oklahoma.

NEW REED TOOL JOINTS—½ PRICE
279 pairs (box & pin' 3½" API full hole super shrink grip tool joints, 4⅝" o.d., 2 7/16" bore, 18" length per pair. 317 pairs (box & pin) 3½" API full hole conventional type, 4⅝" o.d., 2 7/16 bore, 18" length per pair. Arrow Tool & Supply Ltd., Box 4392, South Edmonton, Alberta, Canada.

FRANKS ETS-500—Single Drum Hoist Less Engine. Sales Price—$1,500. General Appearance — Good. Unit complete with Franks Power Take-Off; Mounted on Steel and Wood Truck Bed. Location of Unit—Winfield, Kansas. Contact Cardwell, Wichita.

FOR SALE
INGERSOLL-RAND
GAS ENGINE DRIVEN COMPRESSORS

1—	XVG-8	—350 H.P.
1—	XVG-6	—250 H.P.
1—	XVG-4	—150 H.P.

ANY COMBINATION COMPRESSOR CYLINDERS. SPECIFY INLET AND DISCHARGE PRESSURES. PROMPT DELIVERIES.

EARL E. KNOX COMPANY
TELEPHONE: 2-5204
BACON STREET, ERIE, PA.

PLANT LIQUIDATION

TOWERS AND COLUMNS

1—8' O.D. x 61' 6" SS, 15 trays 50#, 300° F.
1—7' 6" O.D. x 55' 6" steel, 30 trays 45#, 300° F.
1—7' I.D. x 42' steel, 20 trays 40#, 150° F.
1—7' I.D. x 25' 6" SS, 10 trays, 50#, 250° F.
1—6' I.D. x 64' steel, 35 trays, 55#, 300° F.
1—6' I.D. x 45' SS, 15 trays, 850#, 350° F.
1—5' O.D. x 61' 6" steel, 15 trays, 55#, 300° F.
1—4' O.D. x 72' SS, 40 trays, 75#, 300° F.
1—3' 6" I.D. x 63' steel, 35 trays, 55#, 250° F.
1—2' 6" I.D. x 60' steel, 35 trays, 55#, 300° F.
1—2' O.D. x 75' steel, 45 trays, 55#, 300° F.
1—2' I.D. x 39' SS, 40 trays, 70#, 300° F.

HEAT EXCHANGERS-CONDENSERS

2—1440 sq. ft. 304 S.S. 75# PSIG, 350° F.
3—1345 sq. ft. steel, 70# PSIG, 300° F.
2—1125 sq. ft. steel, 850# PSIG, 900° F.
9—Kettle type reboilers, steel & SS, 1250, 1125, 750, 660, 400 & 340 sq. ft.
58—Atmospheric heat exchanger units, 304 stainless steel, 715, 477, 358 & 108 sq. ft.

OTHER ITEMS

Complete oxygen plant, 170 T/Day.
Two Clark gas engine—800 BHP, Rt. Angle Comp.
Two Clark gas engines—150 BHP, Rt. Angle Comp.
Partial list only—Circular on Request.

BRILL EQUIPMENT COMPANY
1101 San Jacinto St., Houston 4, Texas, Justin 6032
Sell us your surplus equipment

FOR SALE EQUIPMENT

BRAND NEW 6x4x6 Worthington Duplex Steam Pumps, $410.00 each, FOB Houston. Subject to Prior Sale. Halloran Equipment Co., 5702 Harvey Wilson Drive, Houston 20, Texas.

SHOT HOLE CASING—Approx. 6,000' of new 3" O.D. x 10' long 16 gauge threaded shot hole casing. 22 cents per foot f.o.b. Tulsa, Oklahoma. Don R. Hinderliter, Inc., P. O. Box 1864, Tulsa 1, Oklahoma.

FOR SALE: 2-Cylinders, complete like new, 14" Stroke, 17" lined to 16" for Clark RA-6 Gas Engine Compressors. Also surplus Power Cylinder Heads at only $95 each. Clark RA-Series, Worthington Type L-170. Refinery Materials Co., P. O. Box 14306, Houston 21, Texas.

FOR SALE OR TRADE: 1 Wilson Giant Drilling Rig, approx. 5000' 4½" Drill Stem, Misc. tools, racks, Etc. 200 M & P Bank Bldg., Sherman, Texas.

70,000' NEW BLACK PIPE, 1½", ¾", 1½" 2" G.V. & GLOBE. R. E. Kershaw, Surplus, 306 S. 4th, Muskogee, Oklahoma.

TWO 80,000 BARREL STORAGE TANKS

120' x 40' Heavy Gauge
Excellent Condition
Suitable for Petrochemicals

MERCHANTS STEEL & SUPPLY CO.
105 S. LaSalle St.
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Phone: Fr. 2-5312

GASOLINE PLANT *FOR SALE*

Gasoline Plant, located in Brazoria County, Texas, shut down in January, 1954. Had been processing approximately thirty-three million feet of gas daily with absorber pressure approximately six hundred thirty pounds. Plant recovered Propane, Butane, Gasoline, Kerosene and Diesel Oil. Adequate storage tanks for all products. Drum Lead Blending Plant. Detailed inventory available upon request.

SOUTHERN PRODUCTION CO., INC.
P. O. Box 670, Ft. Worth, Texas

FULL FACTS, 8" x 10" PHOTOS AIRMAILED ON REQUEST, CALL LOUISVILLE—WABASH 6803

EQUIPMENT BUYS

D8 TRACTOR—CATERPILLAR DIESEL, Ser. #1H4597SP, equipped with crankcase guard, front pull hook, 22" grouser shoes, lower rollers gone over, repaired and replaced where necessary. Balance of machine thoroughly checked over, cleaned and painted. Close-out special.
f.o.b. Louisville, Ky. $5,500.00

HD19 TRACTOR-DOZER — ALLIS-CHALMERS DIESEL, Ser. #HD19H-2116, equipped with Baker straight dozer and Baker hyd. CU, 26" tracks, crankcase guard and front pull hook. Has GMC Diesel engine. Rebuilt Diesel engine, rebuilt blower, installed new clutch in torque converter and reworked all lower rollers, cleaned and painted. Runs perfect.
f.o.b. Evansville, Ind. $7,850.00

TD18 TRACTOR-DOZER — INTERNATIONAL DIESEL, Ser. #TDR28570, equipped with Ateco straight blade and hyd. pump. Machine delivered new in July of 1952. Hourmeter reading 2776 hours. Recently had new rails installed. Has been thoroughly gone over, cleaned and painted. Save money on this excellent machine.
f.o.b. Evansville, Ind. $5,250.00

WHAYNE SUPPLY CO.

800 W. MAIN ST.—LOUISVILLE, KY.
ASHLAND, KY. • BOWLING GREEN, KY.
PADUCAH, KY. • EVANSVILLE, IND.

FOR SALE EQUIPMENT

THREE #12 Sweetland Filters, 48 bronze leaves, monel covered, on 3" C.C., now located in southwest, available for inspection. 11 Sperry 18" x 18" cast iron Filter presses, 11 chambers. Consolidated Products Co. Inc. #65 Garden Street, Hoboken, N. J. N. Y. Tel.: BArclay 7-0600.

4—10,000 bbl. bolted steel tanks, 55' dia. x 24' ht. 1—1550 Gaso pump, size 5 x 10. 2—1550 Gaso pumps, size 2½—5 x 10. 3—Caterpillar diesel power units, No. D 4600. Clark Oil & Refining Corp., P. O. Box 297, Blue Island, Illinois. Tel. WAterfall 8-5200. Attn.:—H. Beck.

FOR SALE: 5700 ft. 4½ Used Drill Pipe. Excellent condition for shallow drilling. Located east of Norman. Randall R. Morton Drilling Co Tulsa, Oklahoma. 5-6609.

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1—M. W. Kellogg, 3805 sq. ft.
1—M. W. Kellogg, 170 sq. ft.
1—Ross 1204-CP, 75 sq. ft.
2—Ross 1209-CP, 263 sq. ft.
Greatly Reduced. Drawings Available.

REFINERY MATERIALS COMPANY
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FOR SALE

1 Cooper Twin Type 80 Rebuilt.
1 Bessemer 80 H.P. type 10 Rebuilt.
1 Twin Superior as is or Rebuilt.
2 Clark 80 H.P. as is.

Above are all direct Gas Engine Driven Compressors with Cylinders to suit job.

Cooper, Clark and Bessemer parts, Compressor Cylinders, all sizes, in our Seminole yard.

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FOR SALE
8" SURFACE CASING

10,000'—8⅛" O.D.

28.55# Lapweld

20' single random lengths, 8 V threads and couplings, used good condition. Priced attractively, Prompt Shipment, Grandview, Mo.

Write, Wire, Phone

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PIPELINE PROJECT
125 W. 3rd St., Tulsa, Oklahoma
Phones 2-9128—54-4229

FOR SALE EQUIPMENT

FOR SALE: Truck mounted Cyclone Model 44, cable tool drilling rig; equipped with everything needed to drill up to 1000 feet plus. Also a two ton Ford truck with oil field bed. Replacement value, on all, over $16,000. Above equipment like new, for $7500.00. Phone Chatham, Ohio 22 or write Bill Fitzsimmons or Paul R. Baldwin, The Baldwin Producing Corporation, Route 5, Medina, Ohio.

FOR SALE—Late Model 36-L Bucyrus-Erie complete with casing strut, auxiliary leg, necessary casing tools. Steel dog house with 6 lockers, Kohler light plant, tool float, 5", 6" and 8" tools complete. 70 bbl. swab tank, 5" and 6" Burt and Guiberson swabs, 1950 ¾ ton Chevrolet Pickup. All in first class shape. Call or write A. F. Johnston or D. W. Palmitier, Box 1820, Pampa, Texas, phone 4-6981.

WILSON ATLAS. Sales Price—$21,000.00. Equipped with two L1-600 Cummins Diesel Engines in good condition: includes pump drive, 12 PD groove sheave and V-belts. One American cathead and one plain spool cathead. Compound enclosed oil-bath. Includes one 1000 gal. fuel tank. Contact Cardwell, Houston.

PRODUCTION EQUIPMENT in use only three months—D-13 National Pumping Unit —15 H.P. Electric Motor. 2500' 5½"—17# Casing. 4000' 2½" 6.4# Tubing. 3800' ¾" Sucker Rods. 7½' x 19' Burt Emulsion Treater. 2—Hi-500 Bbl. Bolted Steel Tanks. Fluid Packed 2½" Tubing Pump. 333—94' Production Derrick. Miscellaneous Equipment for complete well hook-up. Location —Gilbertown, Alabama. Contact Walter Hamilton, P. O. Box 215, Pensacola, Florida.

PIPE. New seamless J55 mill end 5½" and 7" from Pueblo mill. Get our low prices. Dressey & Son, Pueblo, Colorado.

FOR SALE: ENGINE—165 Hp. Climax Model R61, maximum continuous Hp. rating 128. Herndon Drilling Company, 421 Mayo Building, Tulsa, Phone 4-9700.

FOR SALE: 20,000' 2" seamless line pipe. 20' or 40' random lengths. Clean inside and out. Will stand any pressure requirements. Good as new. 20c. M. J. Regan Pipe Co., Coffeyville, Kan.

75,000 ft. 6⅝" O.D. 18.97# P.E. Line Pipe now taking up in Kansas. 7,000 ft. 7" O.D. 26# L.W., 10 thd., Byers W.I. Casing. 3,800 ft. 8⅝" O.D. 32# L.W., 10 thd., Byers W.I. Casing. 3,750 ft. 2⅞" O.D. EUE SS, Rge. 1, 10 thd. Tubing. All strictly A-1.

GLICKMAN IRON & SUPPLY COMPANY
Box 3108 Wichita, Kansas
Phone AMherst 2-6418

Ton and one-half Chevrolet truck, low mileage. Special built aluminum body, 3000 watt fully automatic light plant, 180 gallon water tank, automatic water pump.

Royal Spartanette trailer like brand new. Stop anywhere, hook hose from truck to trailer and plug in lights for city convenience.

Light plant runs off main gasoline tank, has fuel pump. Fill water tank any filling station. Two Butane gas tanks for cooking. Water heated by Electric plant.

Out of this world for out of the way living or for Sportsman, Hunter or Fisherman.

Norvell-Wilder Supply Company,
P. O. Box 2178, Houston, Texas
Telephone ATwood-3471.

EQUIPMENT WANTED

WILL TRADE Steam Drilling Rig complete, less drill pipe, capable of drilling to 11,000 feet for Steel Deck Barge 175' long by 44' wide by 11' deep. Bateman Drilling Company, 601 The Texas Company Bldg., New Orleans 16, Louisiana.

MATERIAL WANTED

One 13⅝" Shaffer Blowout Preventer, Type 39. One 10¾" Shaffer Blowout Preventer, Type 39.

MAKIN DRILLING COMPANY
P.O. Box 1628
Hobbs, New Mexico

EQUIPMENT WANTED

WILL PAY highest prices for used casing, used line pipe, abandoned leases, or other surplus lease equipment. Your idle producing equipment is worth dollars. Green Pipe & Supply Co., Box 1383, Tulsa, Oklahoma.

WANTED: Fractionating column, 8 foot by 70 foot; Vacuum tower, 8 foot by 50; Fractionating column, 3 foot by 25 foot to 30 foot. Address replies to: George J. Chor, Purchasing Agent, N. W. Refining Co., St. Paul Park, Minnesota.

HELP WANTED

GEOPHYSICIST for review interpretation and supervision of seismic work for integrated oil company at permanent location. Please summarize educational and experience background in first letter. Salary commensurate with experience. Box H-245, The Oil and Gas Journal, Tulsa, Oklahoma.

MAJOR OIL COMPANY with Southern Oklahoma Refinery has an opening for a Senior Engineer well experienced in technical service work, with major emphasis on fluid catalytic cracking. Duties will consist of technical advisory work to operating supervision and making economic studies on various operating units. Applicant must be a college graduate in refining or chemical engineering. Give experience and salary required. Box H-231, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER, Production and Water Flood experience to take complete charge of field operations. Give age, experience and salary expected. All replies confidential. Our employees know of this ad. Box H-252, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM OR RESERVOIR ENGINEER

With minimum 3 years experience in development, production and oil and gas reservoir engineering on primary and secondary recovery problems. For New York office of major foreign producer.

MICROPALEONTOLOGIST

Preferably with an advanced degree and a minimum of 5 years' commercial or academic experience. To work in New York research laboratory. This position demands broad interests in Stratigraphy and Biofacies and the capacity to do independent work on projects assigned.

Salary for above positions dependent on experience and qualifications. Write giving full particulars regarding personal history and work experience. Please include telephone number.

RECRUITING SUPERVISOR
BOX OGJ-11

Arabian American Oil Company

505 Park Avenue
New York 22, N. Y.

HELP WANTED

PETROLEUM ENGINEERS: Major oil company in South America has varied positions for single graduate engineers. Must have minimum one year each production and engineering experience. Reply giving full details—age, experience, college, military status, etc. Box H-228, The Oil and Gas Journal, Tulsa, Oklahoma.

SALES ENGINEER—for Gulf Coast Area. Experience in refinery operation essential. Salary and expenses plus commission and other company benefits. Address Vice President, Sales, The J. B. Beaird Company, Inc., Post Office Box 1115, Shreveport, Louisiana.

FOR A BETTER-PAID JOB

Production and Reservoir Engineers, Geologists, Draftsmen; Geophysicists, Party Chiefs, Computers and Field Crew Staff. WRITE US—STRICTEST CONFIDENCE.

GOOD EMPLOYMENT AGENCY
1554 California, Denver. AC 0835

GEOLOGISTS

Major company beginning exploration program in Egypt is accepting applications for the following geological positions:

Research Geologist—regional and local stratigraphic studies; knowledge of micropaleontology; 4 or more years of experience, preferably including foreign.

Photogeologist — experienced in geological interpretation of air photos.

Surface Geologists (3) — 2 or more years of experience in surface mapping.

Junior Geologists (3)—for surface mapping; little or no experience necessary.

Seismograph Geologists (2)—some experience in subsurface and geophysical operations.

Reply, stating qualifications and experence, to:

Box H-216

THE OIL AND GAS JOURNAL

Tulsa, Oklahoma

HELP WANTED

FOREIGN EMPLOYMENT. List of oil companies and drilling contractors showing where to apply for foreign jobs. OIML Co., Box 2603, Tulsa, Okla. $5.00 cash.

PETROLEUM ENGINEER

Core Evaluation
Foreign Employment

For work in petroleum laboratory supervising technicians engaged in determining porosities, permeabilities and fluid saturation on core material from Arabian reservoirs. Personal performance of special core work involving very high and very low range permeability determinations by liquids and gases, core resistivity work, capillary pressure determination and possibly relative permeability and water flood studies.

Degree in chemical engineering, physics, or basic engineering with specific experience in core analysis and evaluation required.

Write giving full particulars regarding personal history and work experience. Please include telephone number.

Recruiting Supervisor
Box 32

Arabian American Oil Company

505 Park Avenue
New York 22, N. Y.

SALES ENGINEER

Gulf Coast Area

The opening is for a Sales Engineer to represent us EXCLUSIVELY in the Gulf Coast Area. Preferably, he should be a petroleum or chemical engineer with at least five years experience in oil refining or allied industries, or with an engineering contractor.

The man for this position should have technical ability plus a good personality, with a broad general knowledge of heat transfer and of process applications in the refining and gasoline industries.

He must have had some experience in selling to these industries and an acquaintance with executives or engineering personnel in the Gulf Coast area.

He must be sincerely interested in a permanent career in Sales Engineering.

We would prefer a man between the ages of 30 and 45.

The future is limited only by a man's own ability to produce results.

If you think that you are fully qualified, write us about yourself, giving full details of your background and past experience. We will consider your letter as confidential and if we think you are qualified we will arrange for an interview.

BORN ENGINEERING COMPANY

P. O. Box 102 — Tulsa, Oklahoma

HELP WANTED

EXCELLENT opportunity with a Midwest Engineering Company for young engineer with B.S. in Chemical Engineering or equivalent. Would participate in new tray design and development with opportunity to enter sales. General experience in fractionation and absorption design desirable. Box H-225, The Oil and Gas Journal, Tulsa, Oklahoma.

SALES REPRESENTATIVES WANTED
Manufacturer of Oil and Gas Separating, Treating and Metering Equipment wants commission Sales Representatives for (1) North Texas, (2) South Texas, (3) South Louisiana, (4) Williston Basin, (5) Illinois, Indiana, and Kentucky. Territories available on exclusive contract basis to qualified salesmen. Please give details concerning present sales coverage, lines handled, and sales personnel when answering. Box H-240, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED, Manufacturers representative with good following among independent and major producers and pipe line companies, to represent the new Carbro Fuel Generator which minimizes fuel costs on pumping wells and pipe line stations. Liberal commissions. Open territories. Please give details of present lines and sales area coverage. Box 487, Wichita, Kansas.

PRODUCTION MAN

AGE 40-50; field experience in 6000-7000 ft. wells. Opening with independent producer North Texas. References and qualifications first letter.

P. O. Box 1824,
Oklahoma City, Oklahoma

SITUATIONS WANTED

PRODUCTION SUPERINTENDENT: 21 years' experience in production engineering and supervision with one major company. Last served as production superintendent. Will relocate for right position. Box H-236, The Oil and Gas Journal, Tulsa, Oklahoma.

YOUNG MAN . . . Excellent educational background, 4 years petroleum analyst Wall St. Willing to learn anything with oil company in Los Angeles. Box H-257, The Oil and Gas Journal.

DRILLER. Experience, 17 years in production and drilling. Any department. Age 37. Absolutely sober. George Markin, 3301 North McKinley, Oklahoma City 18, Oklahoma. Phone Jackson 8-5464.

GEOLOGIST: M.A. Over 3½ years major company experience: 10 months scouting in Louisiana, remainder varied geological work in Rockies. Desires change, prefers location larger city. Box H-258, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST: 35, married, Master's degree, present managerial position: experienced oil and uranium exploration, leasing, engineering, deals and farmouts. Desires position with aggressive independent or individuals in Rocky Mountain region. Box H-259, The Oil and Gas Journal, Tulsa, Oklahoma.

SUPERVISING Pipeline Accountant. Seven years experience with crude-products pipeline operators. Can organize, manage, and handle all administrative detail. Familiar with all Federal accounting requirements. Box H-259, The Oil and Gas Journal, Tulsa, Okla.

Well organized, well established oilwell drilling contractor desires the management and supervision of oil properties in West Texas, Central Texas, and New Mexico. Can provide complete handling of oil properties, from acquisition to production. No properties too small, and none too large to handle. Inquiries from independents, groups, small or medium sized oil companies invited. Write, wire, or call collect for further information.

MAKIN DRILLING COMPANY
P. O. Box 1628, Hobbs, New Mexico,
Phone 3-3141.

146 Allen Building, Midland, Texas,
Phone 2-2962.

SITUATIONS WANTED

OFFICE MANAGER-WAREHOUSEMAN with 8 years' experience in office management, warehousing, and some sales work with major manufacturer. Will relocate for right position. Presently employed. Contact Box H-248, The Oil and Gas Journal, Tulsa Oklahoma.

MINING ENGINEERING Graduate, 34, 5 years oil exploration, 3 years mining, 4 years civil. Desires position offering maximum use of experience. Excellent references in responsible positions. Box H-243, The Oil and Gas Journal, Tulsa, Oklahoma.

SCOUT-LANDMAN, married, degree, references, now working major company Gulf Coast, desires change Rocky Mountain area. Box H-238, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE MAPS

GEOLOGICAL MAPS and FILM. West Texas and southeast New Mexico. Scale 1"=8,000'. One set Permian datum, one set Pre-Permian datum. Sample and electric log datum. (Also film without datum). BASIN OIL MAP SERVICE, 1600 Bedford Drive, Midland, Texas.

MAP CABINETS

END MAP-FILING WORRIES FOREVER! Kraftbilt Rollfiles keep rolled maps safe from dust, dampness, pilferers. Used by all major and hundreds of smaller oil companies. Send for Catalog 352-B. Ross-Martin Co., P. O. Box 800-A, Tulsa, Okla.

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Delaware Corporations formed and serviced, American Guaranty & Trust Company, P.O. Box 487, Wilmington, Delaware.

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FOR LEASE AT LIBERAL, KANSAS: 6,000 feet of store and warehouse space. Attractive new building, masonry construction. Loading dock. Located on 3½ acre tract. Will divide. Ideal for an oil field supply company. H. J. Demmin, phone 3362 or write General Delivery, Liberal, Kansas.

FOR LEASE at Liberal, Kansas. Attractive new building, masonry construction. Loading dock. Located on 3½ acre tract. Edge of Liberal. Will divide. H. J. Demmin, Phone 3362 or write c/o General Delivery, Liberal, Kansas.

TOOL YARD

5 ACRE drilling contractor's tool yard for sale or rent. 3 room tile modern house with full basement; warehouse and pipe racks.

80th & So. Shields on Hiway 77

Call CE 2-6318
Oklahoma City, Oklahoma

PROFESSIONAL SERVICES

CO_2 CONSULTANT

Separation-Purification-Manufacture of Dry Ice from well gases. Design, construction, operation, trouble shooting.

Box H-230
The Oil and Gas Journal
Tulsa, Oklahoma

ROYALTIES

JACK EAGLE, Oil Properties. 706 City Nat'l Bldg., Oklahoma City, Oklahoma. Telephone REgent 6-7027.

ONE HALF undivided Fee Royalty for sale in 309 acre West Texas farm. Leased to Independent. First well in a series already drilled on the farm and completed as a 6,000,000 cubic foot per day gas producer with oil show in lower sand. Next well will commence in 30 days for a probable dual completion. Land on proved commercial oil and gas structure. Located between 7 producing oil and gas fields. $60.00 per acre base. Next well will triple its value. P. O. Box 1493, Fort Worth, Texas.

LEASE AND DRILLING BLOCKS

FOR SALE: 6 Blocks—from 320 to 2820 acres—Harding County, New Mexico—$3.00 per acre—all blocks neighboring each other—can be bought as one drilling block—consists of approximately 9200 acres. J. J. Enkich, 1207B-No. Osage Dr., Tulsa, Oklahoma.

OPERATOR wanted to drill Tennessee acreage over Oil-Gas seepage territory. Valuable gas market adjacent. E. A. Munyan, 102 Fairview Drive, Fairfax, Va.

SEE A. L. BOWLES, Box 947, Ada, Okla., for drilling deals and producing royalties if you have the cash for Oil Investments.

SOUTHEAST GEORGIA Leases: One block, 80 thousand acres for a test. One block, 25 thousand acres, 25 cents acre bonus, details on request. Write Deming, Box 320, Waycross, Georgia.

FOR SALE: Water flood property, partly developed, near Walnut, Kans. Present production 400 bbl. per month. Deep Rock Oil Corp., J. A. Huitt, Tulsa, Okla.; W. E. Walter, Garnett, Kans.

WILL pay cash instantly for lease (large blocks), royalties, mineral deeds, production. Write fully—P. O. Box 2153, Denver, Colorado.

FOR SALE AT PUBLIC AUCTION: Mullendore leases, SW¼ & N½ SW¼ SE¼ 3-30-9, Elk County, Kansas. 6 producing, 2 equipped non-producing wells, power house, engine, lease house, tanks and all equipment. To be sold to highest bidder at south front door of court house in Howard, Kansas at 2 o'clock p. m., Tuesday, July 6th. Abstracts furnished. THOS. C. FORBES, Special Master, phone 195, Eureka, Kansas.

MOFFAT and Mesa Cos., Col., Sublette and Campbell Cos., Wyo. 40 acres $2.00 and 1%. Box H-260, The Oil and Gas Journal, Tulsa, Oklahoma.

OIL AT 800 FEET. Four wells drilled on property made oil in hard sand. Want to drill new well between two of these wells and sand-frac with idea of trying to get results in three wells with one treatment. The cost being too much for present finances, need help. If you are trying to find oil and have solution to this problem, write P. O. Box 235, Wagoner, Oklahoma. Will stand complete investigation.

LEASES ROYALTIES

Producing and Nonproducing
Bought and Sold—Any Area

Inquiries Invited

B. D. BUCKLEY
6635 Delmar Ave., St. Louis 5, Mo.

MONEY RAISING

YOUR FINANCING PROBLEM can most probably be solved. Inquiries invited. Box H-220, The Oil and Gas Journal, Tulsa, Oklahoma.

BUSINESS OPPORTUNITIES

FOR SALE: Well established Pipe Service Co. All equipment in excellent condition. Gross $80,000 1953. Several major company contracts, franchise on part of service, specializing pressure testing, cleaning, threading, etc. Low overhead, best location in Mid-Continent Area. Box H-222, The Oil and Gas Journal, Tulsa, Oklahoma.

WILDCAT COMPLETIONS

(Continued from page 193)

MONTANA

Hill County, Cottonwood area: DeKalb Agricultural Northern Oil Division 1 Ole Meland, C NW SW 21-35n-13e. Dry. TD 4,172 ft. in Lodgepole.

NEVADA

Nye County: Shell Oil Co. 1 Eagle Springs Unit, SE NE NW 35-9n-57e. IPP 373 bbl. of clean oil per day, 6,430-6,730 ft. TD 10,358 ft.

COLORADO

Adams County: Sinclair Oil & Gas Co. 1 Goedert, NE NE SE 24-1s-59w. Dry. TD 6,360 ft.

Eddie Fisher 1 Kolettis, SW SW SW 11-1s-58w. J sand discovery, shut-in. TD 5,935 ft.

Ginther, Warren & Ginther 1 Unit "D," UPRR, SW SW SW 11-3s-60w. Dry. TD 6,563 ft.

Logan County: H. C. Arnold-Phillips & Calvert 1 Arnold State "A," C SW NE 11-7n-55w. Shut-in gas well, "D" sand discovery. TD 5,530 ft.

British-American 1 Northcutt, C SW NE 7-9n-54w. TD 5,465 ft.

British-American 1-"C" Feik, C NE SE 8-8n-54w. Dry. TD 5,468 ft.

Miracle & Fifer 1 Monroe, NE NE NW 10-8n-53w. IPF 302 BOPD, "D" sand discovery, new field. TD 4,960 ft.

E. S. Siler and Federal Oil Co. 1 Sandstead, NE NW NW 27-7n-55w. Dry. TD 5,616 ft.

Moffat County: Sunray Oil Corp. 1 Lookout Mountain unit, W½ NE NE 4-11n-98w. Dry. TD 7,964 ft. in Lance.

Morgan County: Ray Campbell and Colorado-Wyoming Drilling Co. 1 Ross, C NW NW 23-3n-59w. Shut-in gas well, "D" sand discovery. TD 6,035 ft.

Denver Basin 1 Morris, SE NW NW 21-2n-56w. Dry. TD 5,261 ft.

Sharples Oil & Exploration Drilling 1 Clatworthy, SW SW SW 8-3n-58w. Dry. TD 5,978 ft.

S. D. Johnson 1 Sheppard, SE NE SW 11-3n-58w. Dry. TD 5,850 ft.

Moffat County: Kenneth A. Ellison 1 Government, NE NW SE 11-10n-91w. Dry. TD 2,462 ft. in Mesaverde.

Washington County: Cortlandt S. Dietler, O'Donnell & Edmonson and Lion Oil Co. 1 Mock, NW NW NW 6-2s-54w. Dry. TD 4,961 ft.

Lohmann-Johnson Drilling Co., Inc., and C. R. Craig 1 Meyer, SW SW SE 27-4n-53w. Dry. TD 4,943 ft.

Weld County: H. C. Arnold 1 Riddell, C SE SE 18-11n-57w. Dry. TD 6,930 ft.

Continental Oil Co. 1 Prospect Royalty, C SE SW 3-3n-61w. Dry. TD 7,928 ft.

Ryan Oil Co. and Twin "T" 1 Minnie, SW SW SW 30-8n-59w. Dry. TD 6,939 ft.

Yuma County: Ohio Oil Co. 1 Kitzmiller, SE SE SE 32-4n-45w. Dry. TD 5,835 ft.

SASKATCHEWAN

Tide Water 4-28 East Dollard Crown, LSD 4, 28-6-19w3. Dry. TD 5,130 ft.

Imperial 7-20-34-19 Leroy, LSD 7, 20-34-19w2. Dry. TD 1,460 ft.

Imperial 7-17V Smiley South, LSD 7, 17-30-25e. Dry. TD 2,444 ft.

Sun 7-9 Rover "A," LSD 7, 9-9-6w3. Dry. TD 4,402 ft.

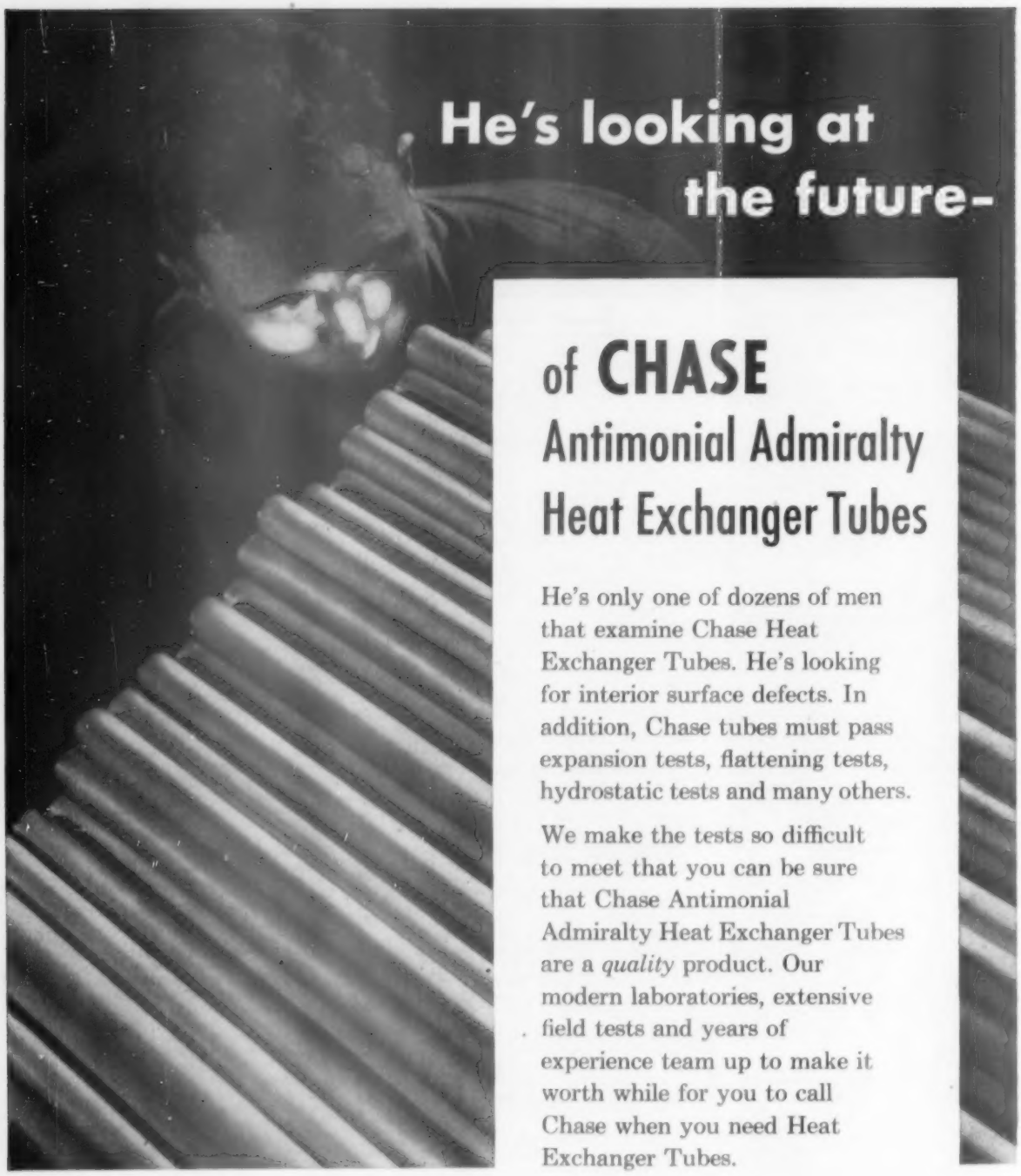
Phillips-Husky 1 Rverson, LSD 4, 11-30-25w3. Dry. TD 2,974 ft.

ADVERTISERS IN THIS ISSUE

Ajax Iron Works 25
Allis-Chalmers Mfg. Co. 10
American Cable Division of American Chain & Cable Inside Back Cover
American Chain Division of American Chain & Cable 173
American Hoist and Derrick Company 134
American Iron & Machine Works Co. 167
Ammann Photogrammetric Engineers, Inc., Jack 182
Armco Drainage & Metal Products, Inc. 28
Armour and Company 7
Autocar Division of the White Motor Company 11
Bakelite Company A Division of Union Carbide and Carbon Corporation 34
Baker Oil Tools, Inc. 70
Barco Manufacturing Company 66
Baroid Sales Division, National Lead Company 191, 192
Bethlehem Steel Co. 51
Black, Sivalls & Bryson, Inc. 177
Broderick & Bascom Rope Co. 43
Buffalo Forge Company 58
Byers & Sons, Incorporated, Harry 167
Chain Belt Co. 12
Chase Brass & Copper Co. 208
Chicago Bridge & Iron Company 69
Chrysler Corporation, Industrial Engine Division 18
Classified Advertising 203, 204, 205, 206
Claymont Steel Products of Wickwire Spencer Steel Division of the Colorado Fuel and Iron Corporation 23
Cleaner Pipelines Co. 147
Cleveland Trencher Company, The 145
Continental Can Company 49
Continental Supply Co., The 43
Core Laboratories, Inc. 160
Crane Co. 150
Crose Manufacturing Co., Inc., M. J. 140
Dean Brothers Pumps, Inc. 148
Detroit Diesel Engine Division, General Motors Corp. 26
Dowell Incorporated 93
Dresser Manufacturing Division 55
Drilling & Service, Inc. 186
du Pont 130
Eaton Manufacturing Company, Axle Div. 44
Edward Valves, Inc. 135
Emerol Manufacturing Company, Inc. 46
Enardo Manufacturing Co. 170
Exploration Surveys, Inc. 179
Fairbanks, Morse & Co. 2
Firestone Plastics Company, Chemical Sales Division 139
Fleet-Line Co. 144
Fluor Corporation Ltd., The 24
Fort Worth National Bank, The 62
Frontier Chemical Company 130
Fulton & Company, R. H. 142
General American Transportation Corporation 68
Glass Fibers, Inc. 143
Globe Oil Tools Company 134
Goodrich Chemical Company, B. F. (Hycar) 90
Gott Mfg. Co., H. P. 148
Grancell, I. H. 136
Guiberson Corporation 64
Halliburton Oil Well Cementing Co. 13, 165
Harnischfeger Corp. 10
Harvey & Co., Ltd., G. A. 59
Hercules Tool Company 187
Huey & Co., S. E. 144
Hughes Tool Co. Back Cover
Ideco A Division of Dresser Equipment Co. 53
Industrial Crane & Hoist Corporation 159
Inferno Co., The 154
Ingalls Shipbuilders Corporation, The 38
International Harvester Co. 128
International Nickel Company, Inc., The 72
Jet-Lube Inc. 154
Johnston Testers, Inc. 31
Jones & Laughlin Steel Corporation Supply Division 50
Jones Company, The S. M. 6
Kelley Company, Ben F. 187
Kellogg Co., The M. W. 39
Kennametal, Inc. 27
Kerrigan Iron Works, Inc. 141
Kinzbach Tool Co., Inc. 167
Koehring Company 169
Lane-Wells Company Front Cover
Lincoln Electric Company, The 54
Link-Belt Company 5
Lonergan Co., J. E. 149
Macwhyte Co. 3
Magnet Cove Barium Corp. 180
Maloney-Crawford Tank & Mfg. Co. 30
Marsh Instrument Co. 45
Martin, Manufacturer, John N. 166
McKissick Products Corporation 176
Mid-Continent Supply Company 8
Midwest Piping Company, Inc. 41
Mission Mfg. Company 56, 57
Mutual Chemical Company of America 123
Nash Engineering Co. 40
National Airoil Burner Co., The 138
National Bank of Commerce, The 172
National Bank of Tulsa 9
National Supply Co., The 32, 33
National Tube Company 36, 37
Nordberg Mfg. Co. 188
Nordstrom Valve Division, Rockwell Manufacturing Company Inside Front Cover
Oil and Gas Journal, The 183
Oil Metering and Processing Equipment Corp. 183
Oil Tool Manufacturing Co. 164
Oil Well Supply Co. 4
Otis Pressure Control, Inc. 181
Paris Distributor, Inc., Henry H. 171
Parkersburg Rig & Reel Co. 15
Peerless Supply Co. Inc. 138
Petreco, A Division of Petrolite Corporation 19, 20
Petroleum Distributing Co. 175
Pipe Line Service Corp. 189
Plastic and Rubber Products Co. 61
Ratigan, Inc., J. P. 135
Republic Flow Meters Co. 140
Republic Steel Corporation 47
Rolo Manufacturing Co. 124
Schlumberger Well Surveying Corp. 133
Shand & Jurs Co. 22
Sherman Products, Inc. 146
Snare Corporation, Frederick 103
Southern Mill & Mfg. Co. 29
Station Construction Co. 149
Stearns-Roger Mfg. Co., The 14
Steel Forgings, Inc. 144
Sun Shipbuilding & Dry Dock Company 52
Tapecoat Company, The 147
Taylor Chain Co., S. G. 175
Thomas Flexible Coupling Co. 174
Thornhill-Craver Co. 21
Tuboscope Company 35
Union Carbide and Carbon Corporation, Bakelite Company 34
Unit Rig & Equipment Co. 184
U. S. Steel Corp. Subsidiaries 4, 17, 36, 37
U. S. Steel Supply Division 17
United Supply & Manufacturing Co. 60
Vapor Recovery Systems Company, The 155
Victor Products Corp. 138
Vinson Supply Co. 48
Visco Products Co., Inc. 90
Vogt Machine Co., Henry 137
Wallace & Tiernan Products, Inc. 130
Wedgeplug Valve Company, Inc. 42
Well Equipment Mfg. Corp. 185
Wheatley Pumps & Valves, Frank 190
Wheeling Machine Products Co. 178
White-Roth Machine Corp. 168
Williams Brothers 65
Yale Machine Works 63
York Co., Inc., Otto H. 67
Zinder & Associates, Inc., H. 183

LEGAL

Sealed bids for Oil and Gas Mining Leases on restricted Allotted lands of the Fort Berthold Indian Reservation, North Dakota will be received at the Office of the Superintendent of the said reservation, New Town, North Dakota, until 2:00 P. M. Central Standard Time on July 1, 1954, and will be opened immediately thereafter in the presence of such bidders as may attend. The total allotted land covered by the advertisement is 26,215.27 acres. All of this land is located in McKenzie County, State of North Dakota. For additional information write the Superintendent of the Fort Berthold Agency, New Town, North Dakota, or call the Agency Land Office, phone 74340, New Town. Ralph M. Shane, Superintendent.



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Of course, it pays to use the one best drilling line—American Cable's TRU-LAY Preformed. But that's only part of it. You must also follow certain practices that start when you order and carry through until you have run every last ton-mile from the line. The beauty of the whole plan is its simplicity and easy operation.

You Can't Afford to Pass It Up

Your nearby American Cable distributor will tell you why one of the two reels illustrated above is better for you—AND—he'll show you how you can *make it cost less*. It won't cost you anything to find out, so why wait. See him today or write our Wilkes-Barre office.

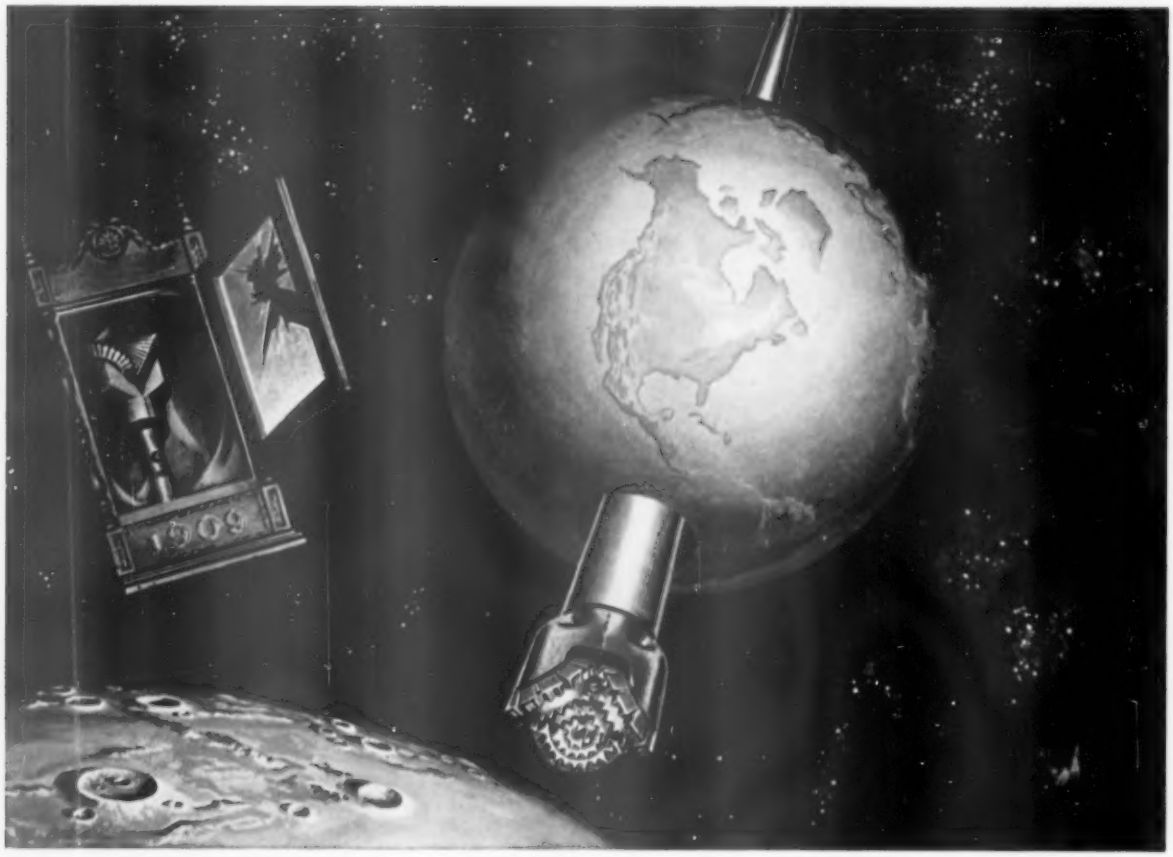
ACCO

TRADE MARK

AMERICAN CABLE DIVISION
AMERICAN CHAIN & CABLE

Plants Houston, Tex., Wilkes-Barre, Pa.
Offices and warehouses: Odessa, Tex., San Francisco, Portland, Ore., Pittsburgh, Philadelphia, New York, Los Angeles, Denver, Chicago, Atlanta, Bridgeport, Conn.

makers of **ACCO Registered WIRE ROPE SLINGS**



~~Ten~~ Times Through The Earth!

NOW TWENTY

The footage drilled by Hughes bits since 1909 exceeds 850,000,000 feet — or more than 20 times through the earth. This represents the industry's greatest rock bit drilling experience.

More footage has been drilled with Hughes rock bits in more formations, under more varied conditions, than with all other rock bits combined.

This rock bit performance experience, coupled with continuous research and the close co-operation of the drilling industry, enables Hughes to design and perfect bits that drill hole faster and more hole per bit!

That's why Hughes rock bits are recognized as the standard of the industry throughout the world.

This is reprint of Hughes advertisement run in 1951 with footage figures corrected to bring them up to date.